PMI

VOL.3NO.12
NOVEMBER
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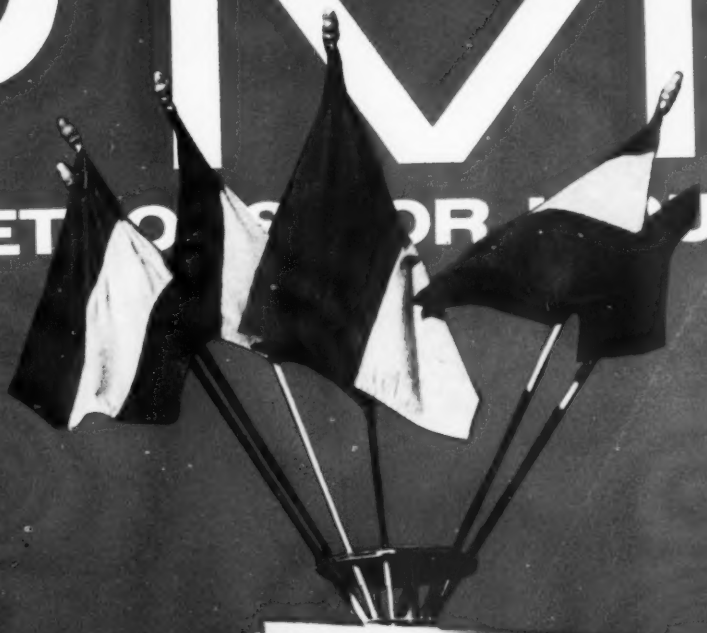
PRICE 50c

PHOTO MET[illegible]OR [illegible]USTRY



INFORMATIONSZENTRALE

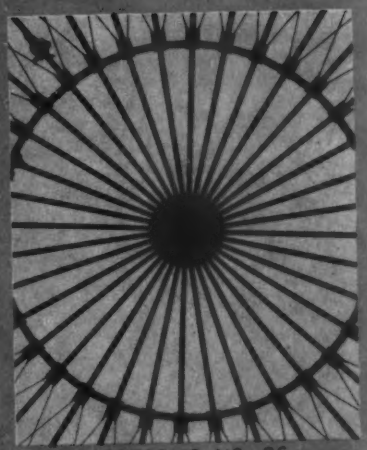
VISITEURS ETRANGERS

PHOTOKINA 1960

AUSLÄNDISCHE BESUCHER

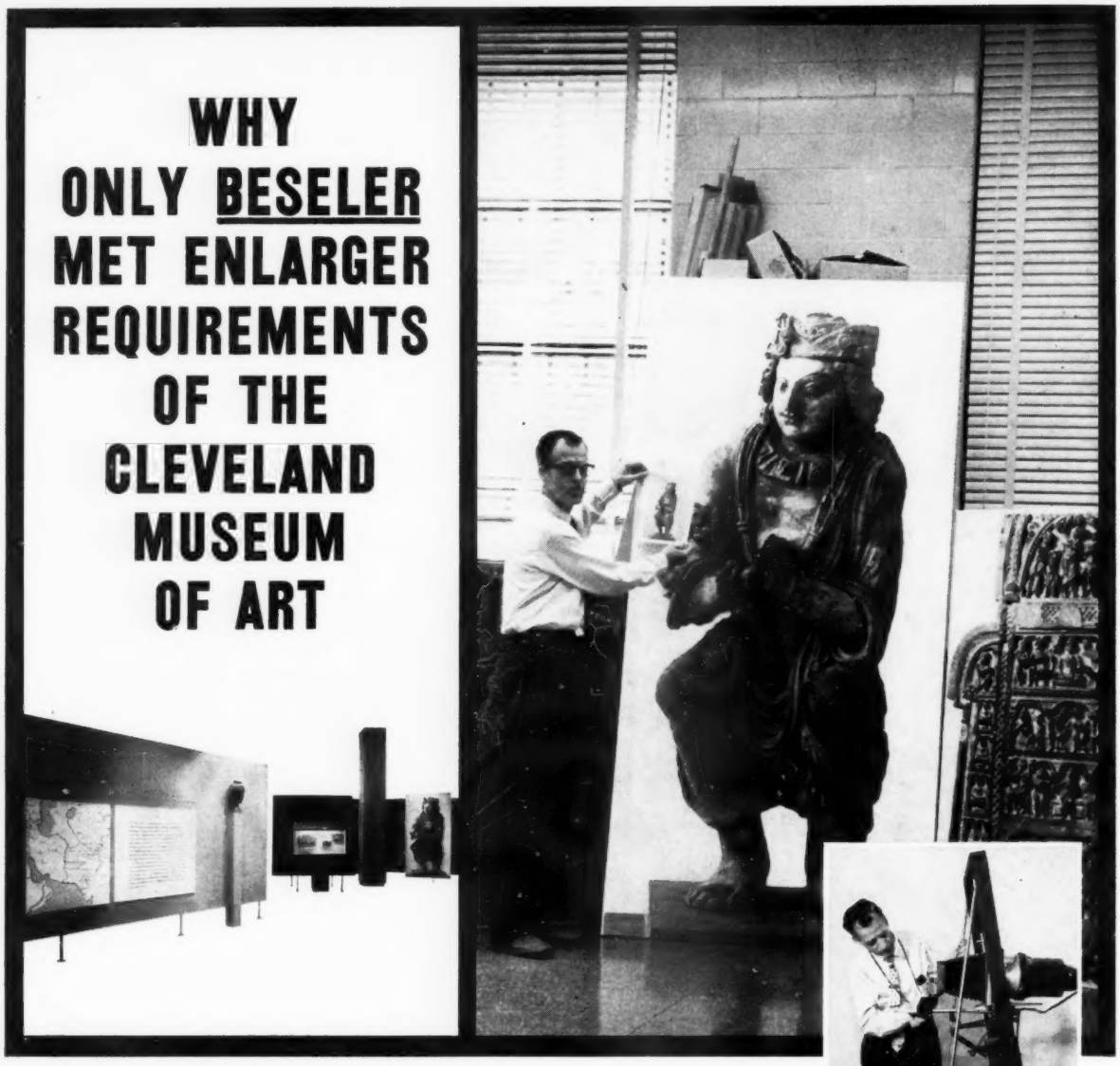
MIDGET SLAVE

PHOTO DEPARTMENT ANALYSIS



PORTFOLIO NO. 26

WHY ONLY BESELER MET ENLARGER REQUIREMENTS OF THE CLEVELAND MUSEUM OF ART



Mr. Richard F. Godfrey, Photographer for the Cleveland Museum of Art, faces a wide range of assignments. Every print he makes is subject to scrutiny by art experts in museums throughout the world.

Making prints with accurate tonal quality and precise definition from edge to edge, even for mural size displays, posed 2 basic darkroom problems. Only the Beseler 45MCR solved these problems.

REQUIRED:

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2. Rapid shifting from vertical to horizontal projection to make display prints as large as 58" x 12 feet.

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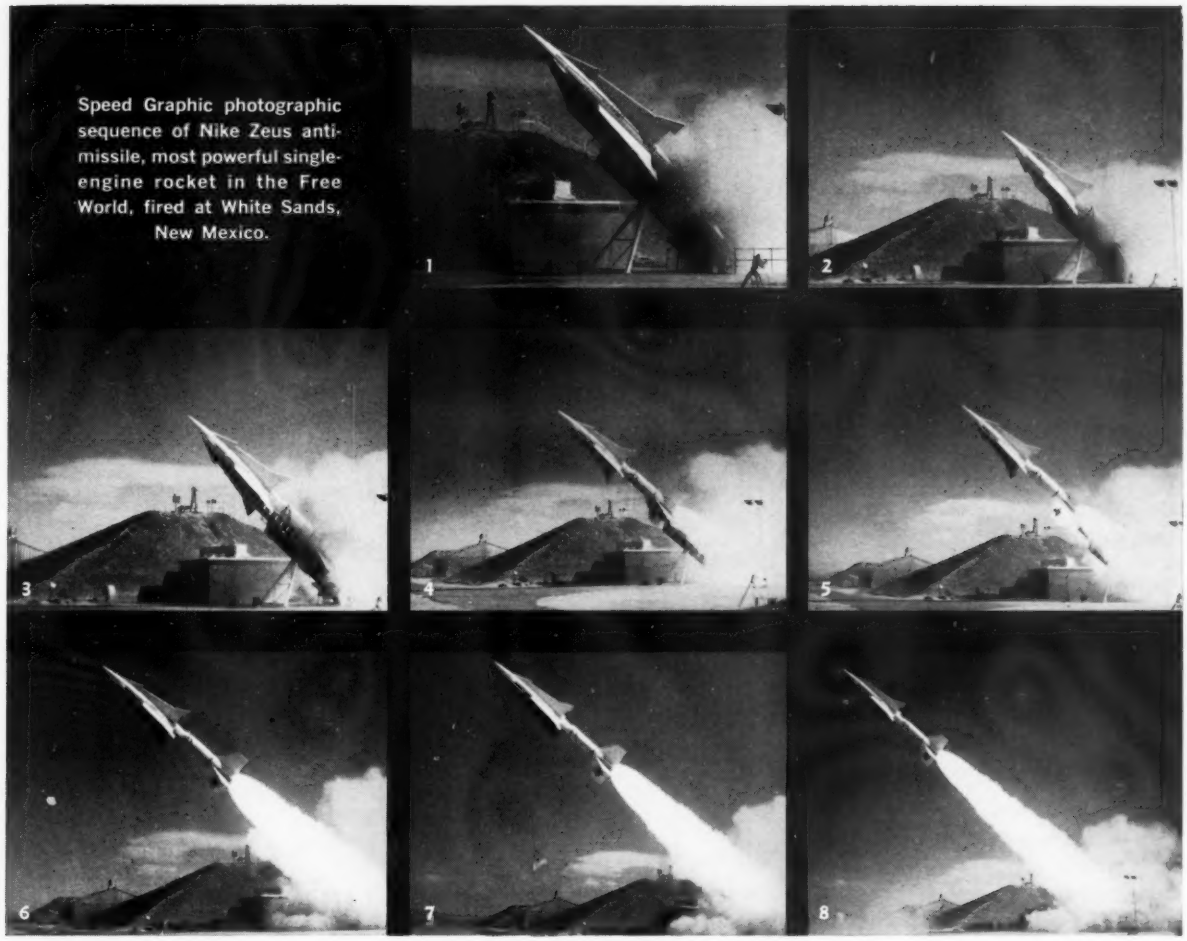
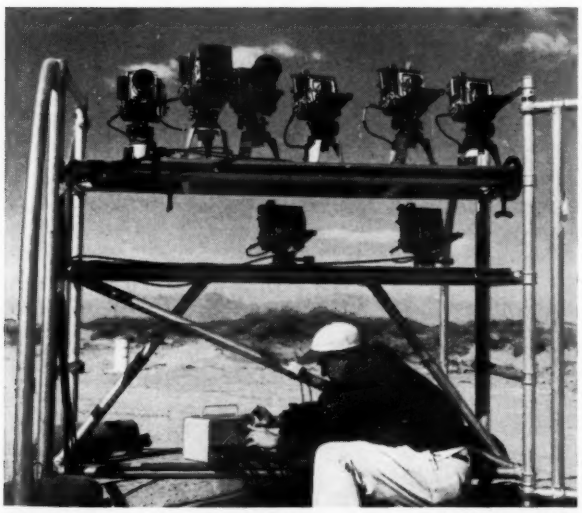
PMI-PHOTO METHODS FOR INDUSTRY IS PUBLISHED MONTHLY EXCEPT SEMI-MONTHLY IN OCTOBER BY THE NPD CORP., 33 WEST 60TH ST., NEW YORK 23, N. Y. SECOND CLASS POSTAGE PAID AT NEW YORK, N. Y. NOVEMBER 1960 VOL. 3, NO. 12. YEARLY SUBSCRIPTION PRICE IS $5.00 IN THE U.S.A. AND CANADA, ELSEWHERE $10.00.



Speed Graphic photographic sequence of Nike Zeus anti-missile, most powerful single-engine rocket in the Free World, fired at White Sands, New Mexico.

GRAPHICS*

RECORD MISSILE FIRING SEQUENCE



Ken McVey, Douglas Aircraft photographer, and battery of eight Speed Graphics used to take this missile firing photographic sequence.

Here is the combination of reasons why Douglas Aircraft selected 4 x 5 Speed Graphics for this special job;

- **The ability to use many lenses of varying focal length.**
- **Top focal plane shutter speeds of 1000 sec.**
- **Big negative format for maximum brilliance and detail.**

Eight Speed Graphics were hooked up to a remote controlled relay unit, which tripped the shutters in sequence at intervals of 1/10 second. This made one of the most spectacular photographic sequences ever recorded.

Each Graphic was fitted with lenses ranging from 135 mm to 15″ telephoto. All shots were made at 1/1000 second except the telephoto shot which required an opening of f/5.6 and a shutter speed of 1/500.

*Trade Mark. For full information regarding Graphic cameras, see your Graflex dealer. Or, write Dept. NA-110, Graflex, Inc., Rochester 3, N. Y. A subsidiary of General Precision Equipment Corp.

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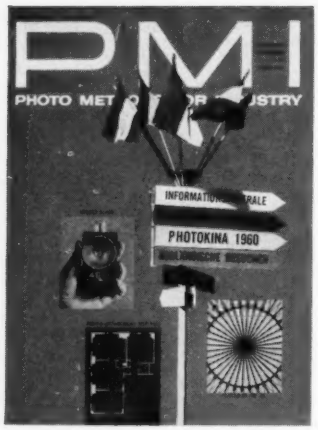

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PMI—Photo Methods for Industry is published monthly except semi-monthly in October by the NPD Corp., 33 West 60th St., New York 23, N. Y. Plaza 7-3700. Mid-west: 6316 N. Lincoln Ave., Chicago, Ill. Irvington 8-4242. Coast: 13758 Victory Blvd., Van Nuys, Calif. Triangle 3-4153. Copyright 1960 NPD Corp. Single copies 50 cents. Yearly subscription price is $5.00 in U.S.A. and Canada. Elsewhere $10.00. Editorial contributions must be accompanied by return postage and will be handled with reasonable care; however, the publisher assumes no responsibility for return of unsolicited photographs or manuscripts. SUBSCRIBERS Send subscription inquiries and address changes to Circulation Manager, Photo Methods for Industry, 33 West 60th St., New York 23, N. Y. Give old and new address, including zone number, if any. Enclose address label from last issue and allow five weeks for change to become effective. POSTMASTER: Send Form 3579 to Photo Methods for Industry, 33 West 60th St., New York 23, N. Y.

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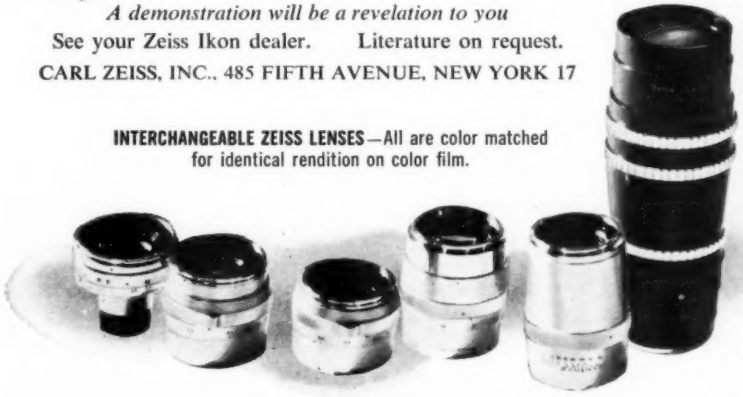
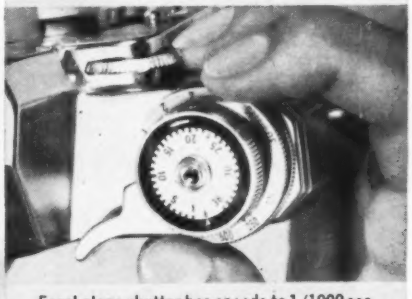


Exposure meter has provision for reflected and incident light readings. Its sensitivity can be increased 16 times by simply removing the baffle.



Focal-plane shutter has speeds to 1/1000 sec. and is fully synchronized. Each speed is color coded and synchronization adjusts automatically as a speed is selected.

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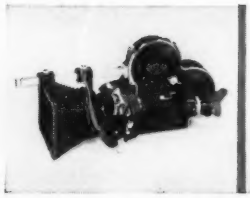
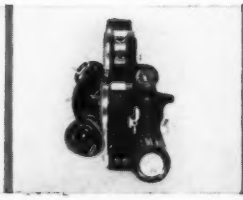
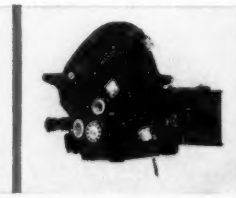


Features: through-the-lens viewing-while-filming; automatic buckle switch; divergent 3-lens turret; registration pin in precision film gate; variable-speed electric motor.



Rear view, showing Arriflex 16's distinctive components: eyepiece of direct-viewing finder; tachometer; footage and frame counters; variable speed control for the motor.

Unique turret design permits any 3 lenses, from extreme-wide-angle to 300 mm telephoto, to be mounted simultaneously without mechanical or optical interference with one another.



Arriflex Sound Blimp plus 400-foot magazine and synchronous 42V motor convert Arriflex 16 to an efficient production camera for industrial, sound stage, and location filming.

Blimp, doors open – 3 separate doors provide easy access to interior; one on top to permit mounting magazine; one in front for access to lens turret; and one at side for inserting camera.

*ANNUAL INDUSTRIAL FILM AWARDS - conducted by the publishers of Industrial Photography magazine.

FOR LITERATURE OR DEMONSTRATION OF ARRIFLEX 16MM AND ARRIFLEX 35MM CAMERAS. WRITE TO:

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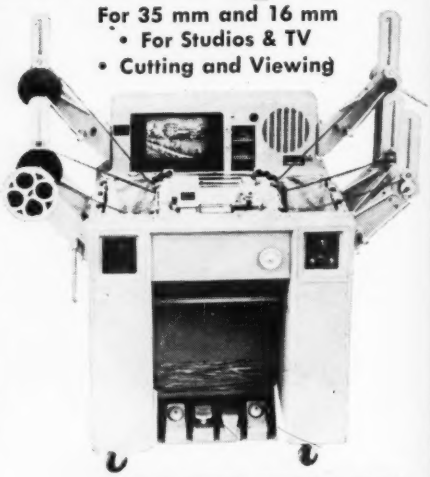

Model A Acmade consisting of one 16 mm picture with composite optical and magnetic tracks, and one separate 16 mm magnetic track, including footage counter and time counter, four torque motors, and four tite wind adapters with two built-in film bins, complete

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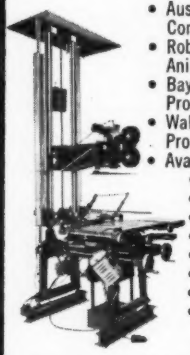

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F.Y.I.

Some time ago, we published a picture taken by Don Landstrom, Goodyear Atomic Corp., showing what could happen if a 440-volt cable were cut. The picture was made for a safety campaign, showing sparks shooting out from between the teeth of a wire cutter.

Not so long ago, we were looking through an English magazine called *Reemer's Photographic Review*, a house organ for one of the largest photo printing and service firms in London. On the second cover, there was a picture which looked familiar. It was, as if you couldn't guess by now, Landstrom's photo. Captioned, *pick of the pictures*, it described the shot as "a picture that just has to be printed". We couldn't agree more. We also would like to convey all sorts of fraternal greetings to Reemer (known on the letterhead as Roy Reemer, Ltd.) and their well-done house organ.

If there is a moral, it is that sending your pictures to PMI gives you a better chance of attaining international fame than if you leave them in the print file of your department.

Ahem! RM

Big things are happening here at PMI. If this issue seems heftier than usual, it is because it is practically two magazines in one. First there is PMI, known to one and all for its hard-hitting attacks on grain and reticulation. Bringing up at the rear is our reproduction supplement, known around the office as RM.

What has happened is that reproduction, which was formerly a by-product, so to speak, of photography, has blossomed, bloomed, expanded, grown until it rates a section all its own. In our modest way, we like to think that it is pretty good and we hope that you, avid reader, will agree. As usual, your comments and suggestions are welcome. Just drop us a line and either pat us or slam us, as you wish.

Along with a new section comes new columnists, specialists in their field to discuss your problems, new products and advanced technical developments. Meet the latest additions to the group of PMI experts.

Arthur D. Even will handle *Data Processing*. Earlier this year, his book *Engineering Data Processing*

(*continued on page* 74)

GET BETTER PICTURES THROUGH CONTROLLED LIGHTING

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The photographs above illustrate how *controlled* lighting makes the difference between ordinary pictures and truly dramatic ones. For the large picture, a Heiland Strobonar 72A was used at the camera and two Strobonar 60S slave units were placed on either side of the subject. The upper small photograph was lighted by the 72A and one 60S, while for the lower picture, only the 72A at the camera was used. Heiland Strobonars give you multiple lighting with a maximum of portability—no bulky lights to carry, no flashbulbs, and no connecting cords between units. Used whenever possible, controlled multiple lighting will make a difference in *your* pictures! Choose from a complete selection of Heiland electronic flash units, including—

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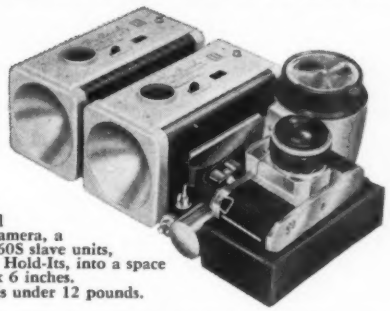

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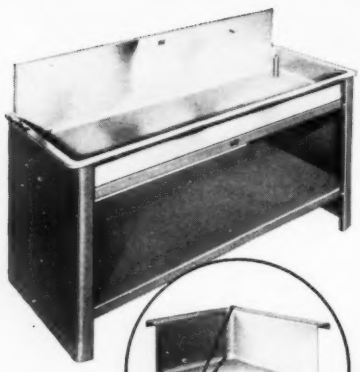

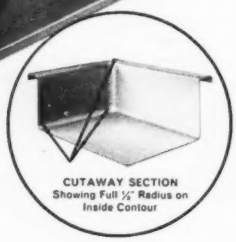

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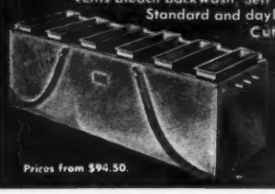

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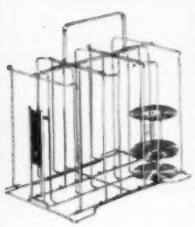

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COMING UP

DECEMBER 3-6 Fourth Annual International Visual Communications Congress, Hotel Sherman, Chicago, Ill.

APRIL 4-6 National Microfilm Association Convention, Hotel Sherman, Chicago, Ill.

MAY 22-26 Annual Conference of the Society of Photographic Scientists & Engineers, Arlington Hotel, Binghamton, N. Y.

MONTHLY MEETINGS

Association of Federal Photographers Meetings every third Wednesday at 8 p.m. G.S.A. Building, 7th and D Sts., S. W., Washington, D.C.

Cleveland Chapter SPSE Meetings the first Tuesday of each month. Cleveland Engineering & Scientific Center, 3100 Chester Ave., Cleveland, Ohio. Contact Robert E. Birr, General Electric, Nela Park, Cleveland, Ohio. GL 1-6600.

Rochester Chapter SPSE First Monday. Contact Woodlief Thomas, Jr. Color Technology Division, Building 65, Kodak Park, Rochester 4, N. Y. CO 6-2500.

Industrial Photographers of America Essex House, Newark, N. J. Meetings every second and fourth Thursday. Contact Tom Holbarton, 181 Lake Drive West, Packanack Lake, Wayne, N. J. Or R. Handley, The Port of New York Authority, 11 8th Ave., New York 11, N. Y. AL 5-1000, Ext. 605.

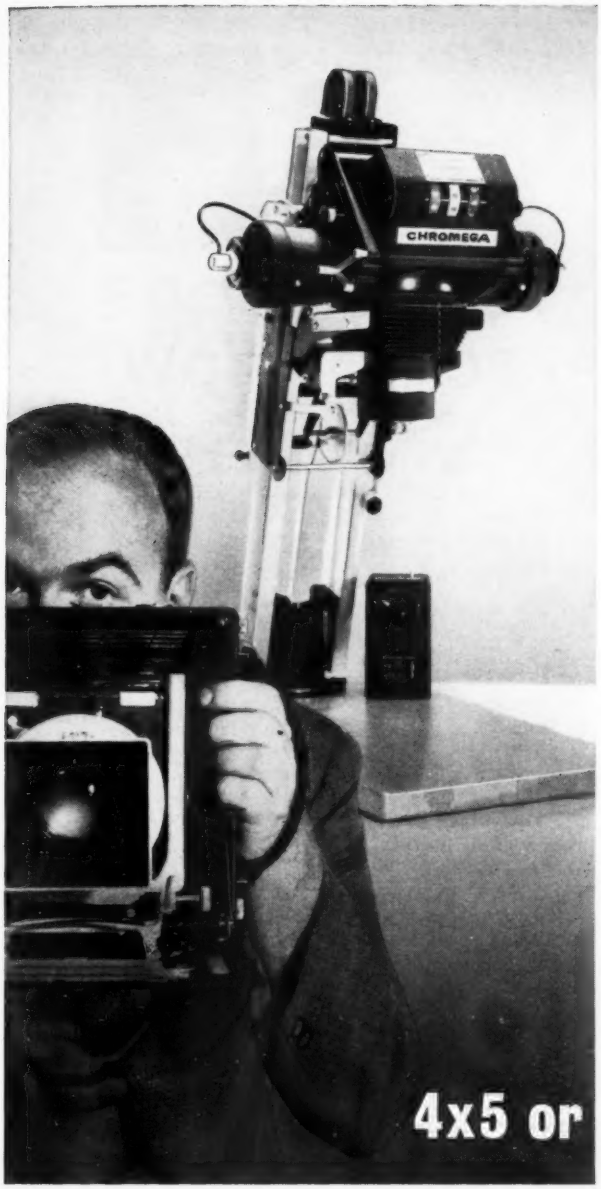
National Visual Presentation Association, Inc. New York City. Meetings every second Thursday. Contact M. E. Schack, 19 W. 44th Street, New York, N. Y. MU 2-2294.

New York Chapter SPIE Meetings every third Thursday. Contact Don Bass, P.O. Box 177, Bethpage, L. I., N. Y. Liggett 4-8196.

New York City Chapter SMPTE Meetings first or second Wednesday of each month. Contact Ed Warnecke, Eastman Kodak Co., 342 Madison Ave., New York, N. Y. MU 7-7080.

Boston Chapter SPSE Contact John Taylor, Itek Corp., 700 Commonwealth Ave., Boston, Mass., CO 7-5210.

(continued on page 21)



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by Lloyd E. Varden

PHOTO METHODS FOR TOMORROW

Report on opening of Haloid Xerox Research and Engineering Center

The formal opening of the $3,000,000 Research and Engineering Center of Haloid Xerox, Inc., in Webster, N.Y., on Sept. 27, 1960, left little doubt in the minds of the hundred or so people in attendance that the development of the electrostatic principle of reproduction had reached its pinnacle. Mr. Chester F. Carlson, the inventor of xerography, who was originally told that his electrostatic image-forming procedure would never be anything but a laboratory curiosity, beamed quite proudly during the lecture sessions when Mr. Joseph C. Wilson, Haloid Xerox President, and Dr. John H. Dessauer, V.P. for Research and Development, reported to the audience that well over 150 new or improved xerographic products had been introduced since 1950. And it was made clear by various demonstrations during the tour of the laboratory facilities that a number of new procedures were in the offing, most of them related to xerography.

The new laboratories are staffed with over 100 professional people (physicists, chemists, mathematicians and engineers) plus another 10 people engaged as technicians, librarians, etc. A major area is solely devoted to methods of "developing" electrostatic images by the attraction of fine particles. The range of activities in this area, which typifies the rest of the laboratories, is well stated in the descriptive booklet given to guests. "Many methods have been examined for generating and charging (fine particles), including the generation of aerosols of dry particles, liquid sprays generated electrostatically, and the mysterious behavior of finely divided material suspended in insulating liquids. Some methods lead to high-resolution images, others to great latitude in exposure, and some to unusual, interesting effects still not associated with goals for final products. The field of valuable ideas in xerography seems inexhaustible."

But xerography is not the only field being researched by Haloid Xerox. New types of photosensitive systems are also under study, for example, a relief image forming system based on photopolymerization. Not enough details were released for a complete description of the process, but the general idea can be gleaned from the following brief outline. First a negative is made whose densities are related to different elevations of the subject, say, a mountain region. This can be done by adaptation of established methods of photogrammetry. Second, the negative is exposed to a fairly thick layer of a special liquid contained in a glass vessel. This liquid is photosensitive and will polymerize according to the amount of exposure it receives. The portion of the liquid that polymerizes—in depth—has a rubbery consistency and can be removed from the container, leaving the non-polymerized liquid behind. Obviously the rubbery portion will show a relief image because the depth of penetration of the light depends upon the amount of light transmitted through different parts of the negative. A rubber mold is then made from the polymer relief, which in turn is used for forming a final plaster cast for hand coloring.

Symposium on rapid processing

On October 14-15, 1960 the Society of Photographic Scientists and Engineers sponsored a symposium on rapid processing at the Shoreham Hotel, in Washington, D.C. The rocket and satellite age will no doubt bring tremendous changes to photographic practice as this symposium already anticipates. The titles of some of the papers presented will give you a clue as to what the future holds. These are

(*continued on page* 14)

Sharper than a needle...

Uncropped, unretouched photo by Harvey Shaman using Minolta SR-1, 100 mm Rokkor lens at f:16 for depth of field, extension bellows at 0.5 magnification, strobe light at 1/50 sec.

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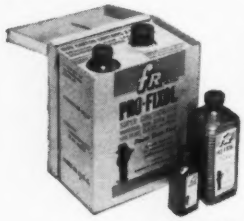

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METHODS FOR TOMORROW

(*continued from page* 12)

listed below with brief comments.

1. Revolution in Photographic Processing, G. T. Eaton (Kodak).

The revolution, as Eaton sees it, is the trend toward the design of processing *systems* which involves many considerations, such as mechanization to meet increased production demands, permanency in some instances and immediate access to image or other recorded data.

2. The Systems Approach to the Design of Rapid Access Photographic Equipment, A. L. Nields (Ansco).

Nields stresses the need for considering the physics of the photographic process, optics, information theory and human engineering, in addition to the mechanical and electrical aspects, in any systems approach.

3. Ansco's Ultra-Rapid Photographic Processing Systems, Zoltan Takats (Ansco).

4. An Advanced Technique for Short Delay Processing of Photographic Emulsions, Robert P. Mason (Photomechanisms).

This paper, as well as No. 3, describes recent advances in rapid machine processing, particularly in respect to new methods of applying solutions to an emulsion surface in a controlled manner.

5. Practical Aspects of Saturated Web Processing, Seymour Schreck (Rapromatic).

By using a web material saturated with processing solutions it is possible to design compact processing machines that give high quality results with a number of photosensitive materials. Exposures on film or paper can be evaluated in a few seconds.

6. Rapid Dry Development of a Silver-Sensitized Recording Paper, P. H. Stewart, W. Bornemann, and W. B. Kendall (Kodak).

A new recording paper has been developed containing all the necessary chemicals for producing an image after exposure, and only heat (plus moisture driven from the paper base and emulsion) is required for processing.

7. Rapid Color Display System, J. P. Delangre (Ramo-Wooldridge).

The system combines a group of devices which are capable within twelve minutes of projecting a color positive image and a variety of symbols in color overlaid in specific locations. Within this short period the color film is exposed first to the symbols optically and then to a color negative by contact, followed by processing.

(*continued on page* 78)

How professional should a camera be?

How much camera should a pro invest in?

First, it depends on the features he needs. If he's like most pros he can't begin to itemize the hundreds of different types of jobs he handles—everything from portraits to microphotography. In the long run he might wind up buying half a dozen "specialized" cameras to fill his requirements.

The single lens reflex Hasselblad eliminates this. With *one camera*, plus interchangeable accessories, you can get over 100 combinations, and set up in seconds for practically every shot known to photography. Four different lenses, three film magazine sizes plus a sheet film holder, four types of viewers—everything changes. The Hasselblad makes it absolutely needless to carry more than one camera on an assignment.

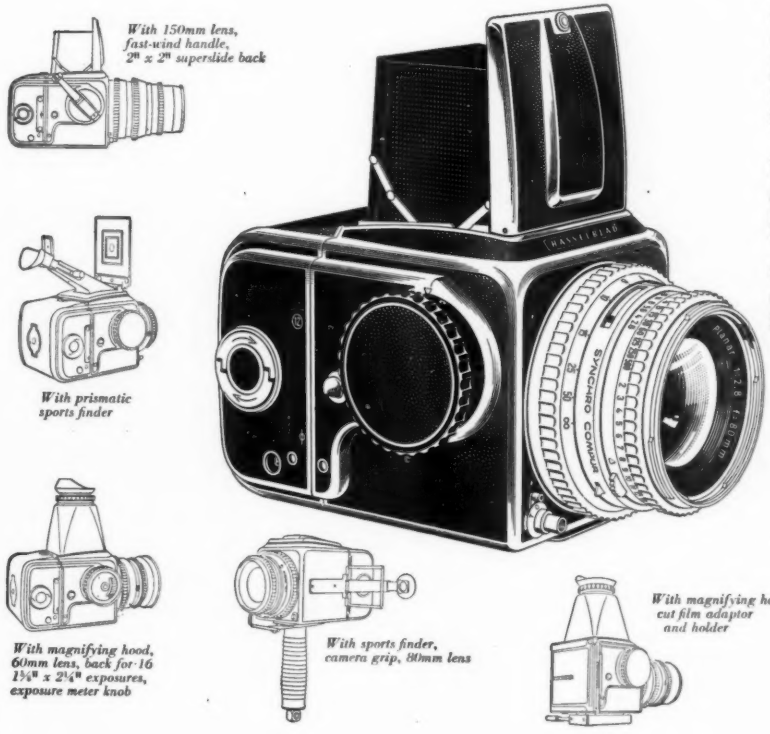
Next, a pro wants quality. How much? Enough to guarantee him perfect results under any circumstances. After all, his living depends on it.

Take the Hasselblad lens. No scrimping on quality. Nearly 50% of a Hasselblad's cost is in the lens. Each one is made by Carl Zeiss and has its own Synchro-Compur shutter and automatic diaphragm. Resolving powers permit greater enlargements than virtually any other lens made. For studio work, *color and detail is up to the best you ever got.*

The precision single lens reflex system, of course, completely eliminates parallax. Focus and depth of field appear on the print-size ground glass just as the film will take them. A pop-up magnifier allows you to focus accurately on minute details. There are no surprises waiting for you in the darkroom with a Hasselblad.

Even the ***"conveniences" on the Hasselblad***, the EVS system, automatic diaphragms (which can also be set manually), and automatic safety devices are to make assignments easier and free you to concentrate on the job. When you use an instrument every day, you have a little convenience coming to you.

How professional should a camera be? As professional as a Hasselblad, *no less.* With Zeiss Planar 80mm f/2.8 lens, $489.50, including F.E.T. Write Dept. HPM-11 for literature and the name of your nearest Hasselblad dealer. PAILLARD Incorporated, 100 Sixth Ave., New York 13, New York.



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3-Lamp Portable Portrait Unit, same as above except with Model K power supply and nickel-cadmium battery.	$338.80

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David B. Eisendrath, Jr.

WORKING PHOTOGRAPHER

Some comments on telling and selling photographic service

Recently I wrote about selling your services and your know-how, letting your abilities and capabilities be known. It occurred to me later that there are so many things photo departments do to call attention to their services to keep themselves on their toes that this in itself might give you some ideas.

First of all, some of the bigger industrial photo-labs have engaged in some excellent programs of communication in just trying to explain basically what various photo techniques and services are. "Buzz" Holland's photo department at North American Aviation, for example, puts out a handsome ring-bound booklet fully ¾ in. thick explaining what various photo techniques and products are, where they can be used to best advantage, the approximate costs and actual samples and examples. Notes on permanence, stability, etc. are also included.

Helpful books

I have several such books put out by Westinghouse and others, explaining what different reproduction methods are, where to use line, halftone, Photostat, etc., and when to use them. Such added hints as methods of mounting, binding, trimming and so on make this a convenient handbook that not only shows the great variety of photography and reproduction available, but also gives the reader the impression that these departments know a good deal about a complex subject. (They do!)

And of course, Holland said, it also helps eliminate orders for some more of "those prints, you know, don't you?" The handbook of services offered by a department can be a good salesman.

Modernage Photo Service in New York City, a custom photofinisher catering to many industrial clients, has a stunt which attracts attention, is a convenience for the customer, and a time and money-saver for them. I pass this along because I'm sure it will be put to use in many industrial departments.

Ralph Baum of Modernage has installed a small Photo-Ray contact printer in the reception room. This is a small and not too expensive rotary printer using fluorescent lamps which give off ultra-violet. Originally it was designed as a simple printer for diazo materials and especially suited for the small engineering or architect's office where it would be a convenience to make quick white prints. It was discovered that this printer, used without the ammonia developing accessory, does a whale of a job of making prints on proofing or printing-out-paper. (This is the red proofing paper portrait studios use.)

On-the-spot proof

Now, if they are making prints from negatives where full negatives are printed straight, it's hard to go wrong, but when clients want cropping, editing or dodging, and contacts are not filed with the negative, a proof on red paper is made on the spot, while the customer waits. This saves time, money, and lets the customer show any print manipulation he may desire by marking the proof. Several industrial departments have installed these not only for quick-proofing for customers, but for inexpensive editing of negatives without the expense or trouble of processing.

Incidentally, if after making red-proofs, you want to preserve some, they can be fixed out in hypo, washed and stored.

Walter Lawton at Stanford Research Institute sends occasional envelopes to various departments with reproductions of bulletin board art, cartoons pertinent to the receiver, slogans and blurbs ("In Case the Boss Calls, Get His Name.") Attached to these is a small card saying that if you want more of these, the photo and reproduction department will supply them, adding, ". . . of course your request will receive bet-

ter than our usual prompt attention if accompanied by an order . . . have your reports been adequately illustrated?"

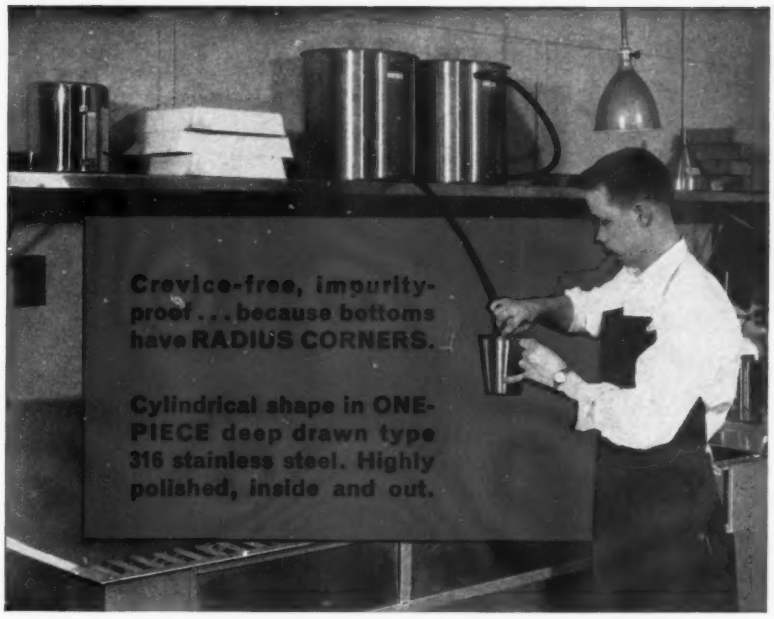
This may appear to be unbusinesslike, yet it reminds customers of Lawton's service. Lawton also has several meeting rooms and projection rooms which his department maintains and operates for groups within his organization wanting meeting space with audio-visual facilities. A regular mailing (interdepartmental mail) to his customers reminds them of what is available, offers projectionists and all facilities.

Another photo department I know of sends out monthly notes to various departments telling about its special services, a new piece of equipment it has just acquired and what it can do, and suggestions for preparing subjects to be photographed. Some of their recent mailings tell how to save money in ordering photo prints (if you will have need for more prints at a later date, it's cheaper to order them all at once); how to evaluate what kind of visuals will be needed (how many people will see the screen, how much information will be shown); and occasional news notes from magazines on how similar industries are using photography.

Neatest system for economy I've seen is one where a special rubber stamp goes on to all RUSH orders. This shows when order was given, when it was promised for, what time it was FINISHED, and how much later it was PICKED UP. They charge a surcharge on RUSH orders only when they are picked up more than an hour after request time. This means that if prints are needed at two o'clock and the order is not picked up until four, they really didn't need it in such a hurry. A few months after this system was put into effect, rush orders dropped appreciably. Asking a skilled printer to make rush prints which are not needed in a hurry is an imposition which sacrifices quality.

Many industrial departments offer constantly changing exhibitions of examples of their work, both fine commercial shots as well as pictures which solve technical problems.

This by no means indicates that the photo department has time on its hands. Rather, it calls attention to the service and ability of the department, and keeps others constantly reminded of the new tools, techniques, and activities of the photo department. What's more, it appears to bring in a bit of respect, something that most industrial photographers see too little of.—THE END.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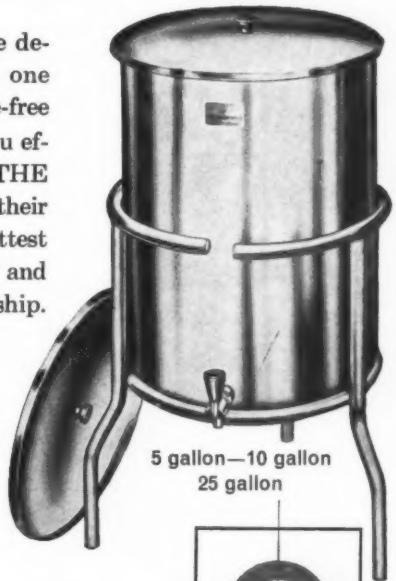

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Edward R. Farber

ELECTRONIC FLASH

They come apart, snap back together, switch from left to right

New electronic flash units have been appearing smaller, lighter, brighter and cheaper. Though we haven't had a chance to try all of them, we will review them as best we can.

If you read magazines at all you must know that Heiland has a new Strobonar Futuramic II. Although its advertising shows the Futuramic is used only by women it is also of interest to male industrial photographers. The new unit is only 9½ in. high, weighs just 29 oz. and will operate on AC or from three size C cells of the photoflash, nickel cadmium or energizer variety. An accessory charger is provided for the nickel cadmium units. The 1/2000 sec. exposure will give daylight exposure of Kodachrome at f/2.8 at 13 ft., according to the manufacturer's rating. The lens is color corrected for "warm natural pictures."

Hico unit

Hico brought forth a new 200-watt-sec. unit that had professionals crowding around the booth when it was introduced at the recent PPofA convention in Chicago. This unit, like the Braun Hobby, uses a vibrator instead of transistors to insure rapid recycling. Transistors and a zener diode are used in the monitor that automatically stabilized the voltage. Charger and AC operation are built-in. A rugged rotary switch provides variable output of ¼, ½ and ¾ of maximum output. A 6-volt nickel cadmium battery plus the monitoring circuit which reduces idling current to almost nothing, enables Hico to guarantee 130 full-power shots from a fully charged battery. This was a most desired feature by the wedding photographers who need at least that many consecutive shots for color jobs. They liked the Kodachrome guide number of 70. This writer believes that the manufacturer has sincerely tried his best to incorporate the best electronic and electrical practices in the design of the equipment. Such touches as the use of silicone greases for moisture protection, rugged high-voltage connectors, locking-type plugs with quick release, a ready light that gives an honest signal—all are worthy. This unit sells for $199.50 direct from the manufacturer, and is not available from photo stores, which may tend to make some dealers less than enthusiastic about the product.

Surprise

Probably one of the surprises of the professional show was what styling did for the "Starlighter" line of equipment by Scheibe Engineering. This is a portrait unit as you may recall. Scheibe finished them in white with touches of gold. They add so much status to a studio (as well as glamor to the equipment) that it's easy to see why many a potential customer was convinced on sight. This Burlington, Wisc., firm has just moved into a new building complete with demonstration studio, separate machine shop and assembly floor and greatly improved facilities for sales and service.

Speedotron has been working on a new unit for photography of the eye, as have some other manufacturers, but designer Don Communale seems to have combined the experiences of the past with a few ideas of his own to produce a good, simple unit which will be available soon. Don was doubtless the first to install electronic flash in spectacular signs. The Admiral sign in Chicago has been operating with sky rocket bursts for well over 10 years. Don's lights also take part in the startling display that occurs in Chicago's Comiskey Park every time the Sox hit a home run. The scoreboard goes into a violent and noisy routine including a speedlight display and ending with a thousand dollars' worth of fireworks.

Hershey has a new, larger ring light and a new portable wedding unit, the Sunlite III. The III uses two Eveready 491 batteries and will give 3500 flashes with a 2 to 3-sec.

recycle time with a reasonable duty cycle. Rated at 50-watt-sec., it is $55 less batteries. A good one for those who need the really rapid recycle of a high-voltage battery unit.

"Flexible Flashmaster"

Photogenic has a "Flexible Flashmaster" unit aimed at the home portrait and school photography field. A variety of lighting units are available to operate (up to four) from this 200 or 400-watt-sec. pack. It handles up to four lights. The unit offers the most remarkable do-it-yourself repair feature. Every component part plugs in. Tiny disconnects on all the wiring enable anyone to replace parts in the field without a soldering iron. Even the transformer can be replaced in minutes. Trigger tube, rectifier, and voltage monitoring tubes are mounted on plug-in sub-assemblies. The layout, wiring and mechanics of this unit are the finest this reporter has seen in any commercial flash apparatus, from strain reliefs on the cords to the ventilation of the cabinet. Recycle time is only 4 sec., making it ideal for use with automatic cameras.

Ascor, too, has a new unit for school work, the A425 and A426, identical except that the latter has light output stabilization and can be switched instantly from left hand to right hand lighting. (This enables the sitter to face to the left or right depending on which they feel is their "best side" without need for the photographer to interchange main and fill lights.) Brightness is shifted by a switch on the unit. This feature can speed up production without sacrificing lighting quality.

Conversion

Harold Low of Leica Technical Service announces that because of the increasing popularity of nickel cadmium batteries, LTS has made arrangements for conversion of Braun Hobby EF2 units to the EF2NC type. The cost will be $31.68 for the battery and $4 for the conversion. Units should be shipped directly to E. Leitz, Inc., Repair Dept., 304 Hudson St., New York 13, N. Y. accompanied by a request for conversion. Allow eight weeks, since batteries may not be in stock.

The Heiland Repronar for slide reproduction has been improved mechanically and electrically to increase the ease and rapidity of operation. Whether it's simple duplication or enlargement or reduction, color or over or underexposures, or the production of filmstrips, this ingenious device can easily earn its $325 price tag.—THE END

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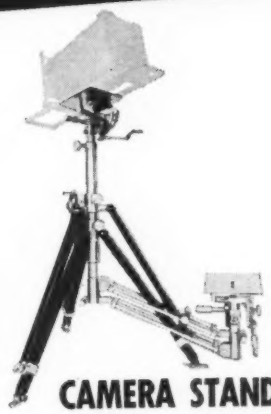

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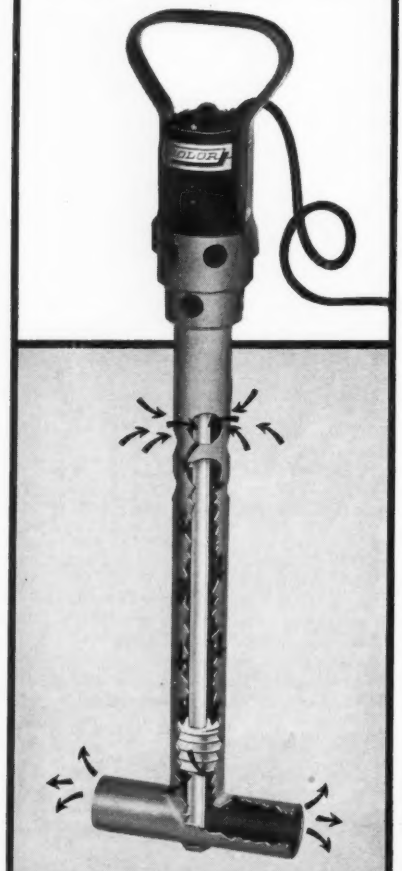

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Samuel Lang & Leonard Zoref

INDUSTRIAL COLOR

Your eyes are of little help in overcoming mixed-light problem

The nemesis of the working photographer is location shots that are illuminated with light of vastly different Kelvin temperatures. There are several ways this problem can be practically eliminated and in some cases even taken advantage of.

Our color vision is a phenomenon to be marveled at. As long as a light source is reasonably white all surrounding colors will look pretty normal. Our brain will shift our color values with the temperature of the light over a range 2900K to 6500K or more, a range that would shift a blue from green to grey with a representational sample of color films.

In previous columns we have discussed why this takes place on the various color films. The present day technology doesn't give much hope for solving this problem with reversal films. The negative color approach offers more leeway but it too can have its limitations.

The best color temperature meter is one every photographer has—his own color film. The main drawback to color temperature meters is that none of them is quite as sensitive as the color film in pointing out color deviations. At times, even the very slightest caste of color in a highlight will seem quite objectionable.

Unfortunately, it s rare that the photographer has a chance to test dubous lighting quality or color balance with his film. If it's a studio set-up, he knows the quality of the illumination beforehand. If he's on location, he has no time to wait for a test shot.

Land ahoy

When Polaroid color comes along we can't see why it also can't be used as a color temperature meter. And this may be the way out for the hard-pressed photographer.

Test shots could be made with various filters until the desired color balance is obtained, then the same filter or filters can be used on your camera lens to shoot your color transparencies.

But the question remains, what do we do now? We can only try to outguess the situation or compromise the color.

Let us take the situation of the interior that has a large amount of daylight entering the room but not quite enough to use as the sole source. You now have to use daylight film and throw in a matching light source. This could be electronic flash, blue flash bulbs, or blue photofloods.

Some photographers would prefer to use the blue floods, but if you lean too heavily on them so that they become your main source, with the daylight as your fill-in light, the subject matter tends to take on an orange cast. This is due to the bulbs burning too close to 5000K while the daylight color film is balanced for 6000K. When you desire the subject matter to be normally exposed outdoors and indoors simultaneously you have an extreme contrast problem. The light outdoors is usually so bright that you cannot sufficiently fill the interior.

There is a gimmick that is used in movie making that can also be used by the still photographer. Change the light coming from the windows to 3200K lamps with 85B filters. These filters are available in New York from motion picture equipment suppliers or from a company in Brooklyn called Rosco Laboratories. They manufacture it under the trade name of Roscolene. It is available in roll form 42 in. wide and 25 ft. long for about $25. They are also available in 50-ft. rolls and large size sheets. They seem to be made of a rather heavy-guage plastic or acetate and should therefore be reusable many times. We haven't heard of it being used over a strobe light. We wonder if it would also knock the color temperature down sufficiently so that it could be used

on tungsten film. If any one does try it, write us and we will publish the results in this column.

A problem that is becoming increasingly difficult is fluorescent lamps. There are installations that have mixed color tubes in the same fixtures. All you can do is to expose for tubes that are the majority, using the table of filters and color tubes published in our column (May 1960).

When a room is illuminated with tungsten light, usually a pale blue filter, possibly a Wratten 82B will correct sufficiently to give a pleasing rendition on 3200K balance film. When a shot is taken outdoors at night with a mixture of artificial light (neon, tungsten, fluorescent, etc.) daylight film will usually give the most pleasing rendition.

Our last comment: All the above information applies to negative color as well. The best results are obtained in your prints when your color negative is shot with the same care you would use to shoot a transparency. It is true that a color negative can be made either with a tungsten or daylight source without any filters, but don't mix sources, they can't be unscrambled in printing.—THE END

COMING UP

(*continued from page* 10)

Binghamton Chapter SPSE Meetings every third Tuesday. Contact H. G. Morse, Ansco, Binghamton, N. Y. RA 2-4221, Ext. 573.

Midwest Industrial Photographers' Association Contact John E. Schrage, c/o Deere & Co., Photo Department, 3300 River Drive, Moline, Ill.

Rocky Mountain Industrial Photographers Meetings every fourth Monday. Contact P. H. Broadie, 2170 S. Lincoln, Denver 10, Colo. Telephone PEarl 3-2200.

Southern California Chapter SPSE Meetings the last Monday of each month. Contact Ben Augustine, 235 Annandale Rd., Pasadena 2, Calif. Telephone MU 1-0076.

Southern California Chapter Industrial Photographers Meetings every third Tuesday. Contact Janet Marshall, Executive Secretary, 5463 Virginia Ave., Los Angeles 29, Calif. HO 5-6614.

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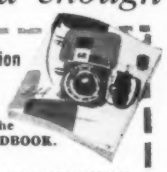

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Arnold Eagle

INDUSTRIAL MOTION PICTURES

Photography is the same, but stills and motion pictures are different

A creative and experienced still photographer has many advantages when he turns to motion pictures. This is borne out by the fact that many, if not most, of the creative film makers, cameramen and directors started out on their movie careers with an extensive still photography background. But I would like to emphasize from the start that the still photographer's experience decreases only slightly the number of problems all beginners have when they want to make movies. Probably the best and most foolproof way for a still man to break into films would be for him to act as a cameraman for an experienced movie director. If he approaches this relationship with a certain amount of humility, he may find out a great deal about film that he does not know. But this ideal situation is not always possible. So, the still photographer must start at the beginning, with everybody else but, with certain advantages.

The visual and technical training already possessed by the still photographer is a necessary background for all cameramen and directors. The ability to select the proper angles, arranging for dramatic composition, effective lighting, are all vital in motion pictures. The movie cameraman or director unfortunate enough not to have this training and background must get it through the view finder of the movie camera. It is my opinion that the man who has still camera training has the advantage of a more flexible approach pictorially. The movie camera is usually heavier, bulkier and is usually on a tripod. It takes effort to change angles or heights. It is quite natural for a still photographer, when he is shooting to ask for a step ladder, to climb up on some piece of furniture, to lie on his stomach or back to get desired angles. With professional movie equipment, it is much more difficult and time consuming to change from a five foot level to a three foot level. It involves taking the camera off its original tripod and putting it on a high boy or a high hat. This may mean a loss of 5 to 15 minutes. So the man with movie training only may be a little reluctant to look for unusual angles. Although he may realize that a low angle will give him a more exciting picture, he may make excuses: "This height is good enough—I'll just put on another lens."

I have noticed that cameramen with creative still backgrounds are more willing to spend the time to get unusual shots. They also prefer lighter and more flexible equipment to perhaps more reliable but heavier equipment. They are willing to sacrifice a certain amount of quality in exchange for mobility and flexibility. They also tend to be more experimental, a quality which is the foundation for creative film work.

Regardless of background training, regardless of past experience with still photography, graphic arts, poster design, magazine layout, radio announcing or professional acting, all beginners have the same main problem: they possess only very superficial knowledge of basic cinematic technique. As I have noted in previous columns, this technique is rather elusive and not obvious to the casual observer and lay public. If the construction and editing technique were obvious, it would be very disturbing to the viewer. It is only when you know what you are looking for, when you are not involved in following the story line and when you conscientiously and carefully begin to analyze, that the technique will reveal itself.

Let us come back to the specific problem of the still photographer. I think that his experience with photography creates a misconception about film making. To be more definite, I feel that when the still photographer thinks of movies, he places undue emphasis on the importance of the camera itself and of photography. To a great degree, he ignores the other aspects of film making, such as editing, cinematic continuity,

(*continued on page* 24)

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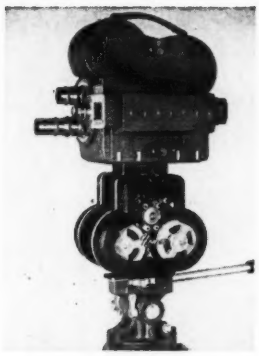

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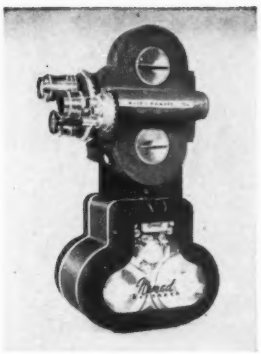

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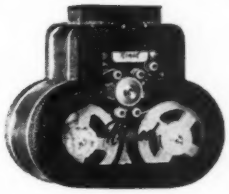

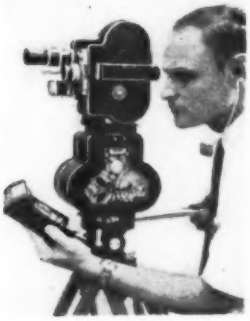

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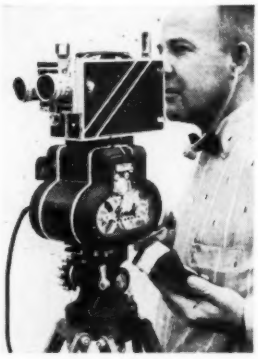

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(*continued from page 22*)

construction, and story line, all of which are equally important. I have observed, for instance, that when a still man contemplates making a movie, he worries mostly about handling a movie camera. The fact is that an experienced photographer can master the loading and operating of a professional movie camera within an hour. I really think a movie camera is simpler to use than a Leica or a Rolleiflex. For one thing, the movie camera, for general purposes, has only one speed, usually 1/50 sec., which means 24 frames per second. (Professionally, no one uses the silent speed of 16 frames per second.) You don't have to make decisions such as whether you should set it at 1/10 sec. and close the lens down, or use 1/1000 sec. and leave it wide open. Your diaphragm stop will depend entirely on the speed of the film and the amount of light on the subject. Your exposure is constant. Only when it comes to moving the camera; panning, tilting, dollying, will lack of experience show in the footage.

The still photographer tends to overvalue the role of the cameraman in making a film. He thinks of the cameraman as the only or the most important man in making a film. The truth is, that in any professional crew, the role of the cameraman is secondary to the director. In movies it is the director who is the boss. It is he who sets the standard. It is he who is responsible for every phase of the production. He tells the cameraman where to set up, what angle to shoot from, what lighting he wants.

I don't want to minimize the importance of the contribution a good camerman makes to any film. His eye for composition and lighting and his suggestions are very important. For that matter, so is the skill and contribution of the script writer, the sound man, and especially the editor. But, on the whole, it is the director who is the final judge of what type of stuff is needed for the film.

In many small films, a director-cameraman is the ideal solution. But this situation is possible only on small films where very little directing on location is necessary. It is very difficult for a cameraman whose eye is glued to the view finder to direct the people in front of the camera.

The great weakness of all beginners is their complete ignorance or meager knowledge of cinematic technique. Regardless of how creative in photography a beginner is, if he does not possess sufficient cinematic know-how, he is like a chess player

who has just learned the rules of the game. The new player thinks only one move ahead, and only in terms of taking his opponent's pieces. This kind of playing has nothing to do with the real art of chess playing, where every move is part of a complex strategy and where a player will sacrifice an important piece to gain advantage in position. One must think four or five moves ahead, and guess accurately just what his opponent is planning to do.

It may look as though I think making a film is a single well-defined task with uniform problems. This is far from the truth. Making a movie can mean the 8mm effort of Aunt Minnie recording her two-week vacation in Mexico or a $15,000,000 Hollywood extravaganza. Of course, I am not talking about either of these extremes, but about the so-called nontheatrical films, a catch-all term that includes dozens of categories, with budgets ranging from $250 to over $150,000.

Let us come back to the problem of the still photographer starting in movies. There is the style of film (I don't want to confuse you by calling it a movie technique) that any good still photographer who knows how to compose and expose can do with a little practice. That is the newsreel-type film, that depends completely on narration or titles for continuity and logic. In this type of film, each cut is an entity by itself. Usually there is no direct visual relationship to the preceding or following shots. The major function of the visual images on the screen is to illustrate the narration or dialogue. It is similar to a sound filmstrip but is more effective because there is movement on the screen. Because of this, the image on the screen will hold the attention of the viewer better and longer. Without the narration, dialogue or titles, the images by themselves are usually meaningless and the viewer cannot follow the story. On the other hand, the narration without the images can be enjoyed like a radio program.

This type of simple narration film can be very useful especially when the budget is low, or there is not enough time for a more elaborately planned film. A great majority of our educational lecture films, travel films, sales films and so-called industrial films are made this way. I hope I don't sound patronizing about these films. Some of them are beautiful, effective, useful, and very enjoyable. This type of film is what the beginner should start his movie career with. I will give one piece of advice here: Keep it short!

(*continued on page 78*)

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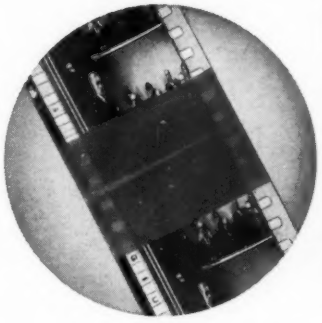

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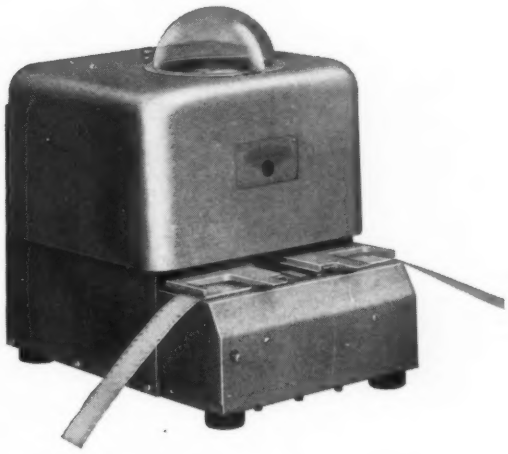

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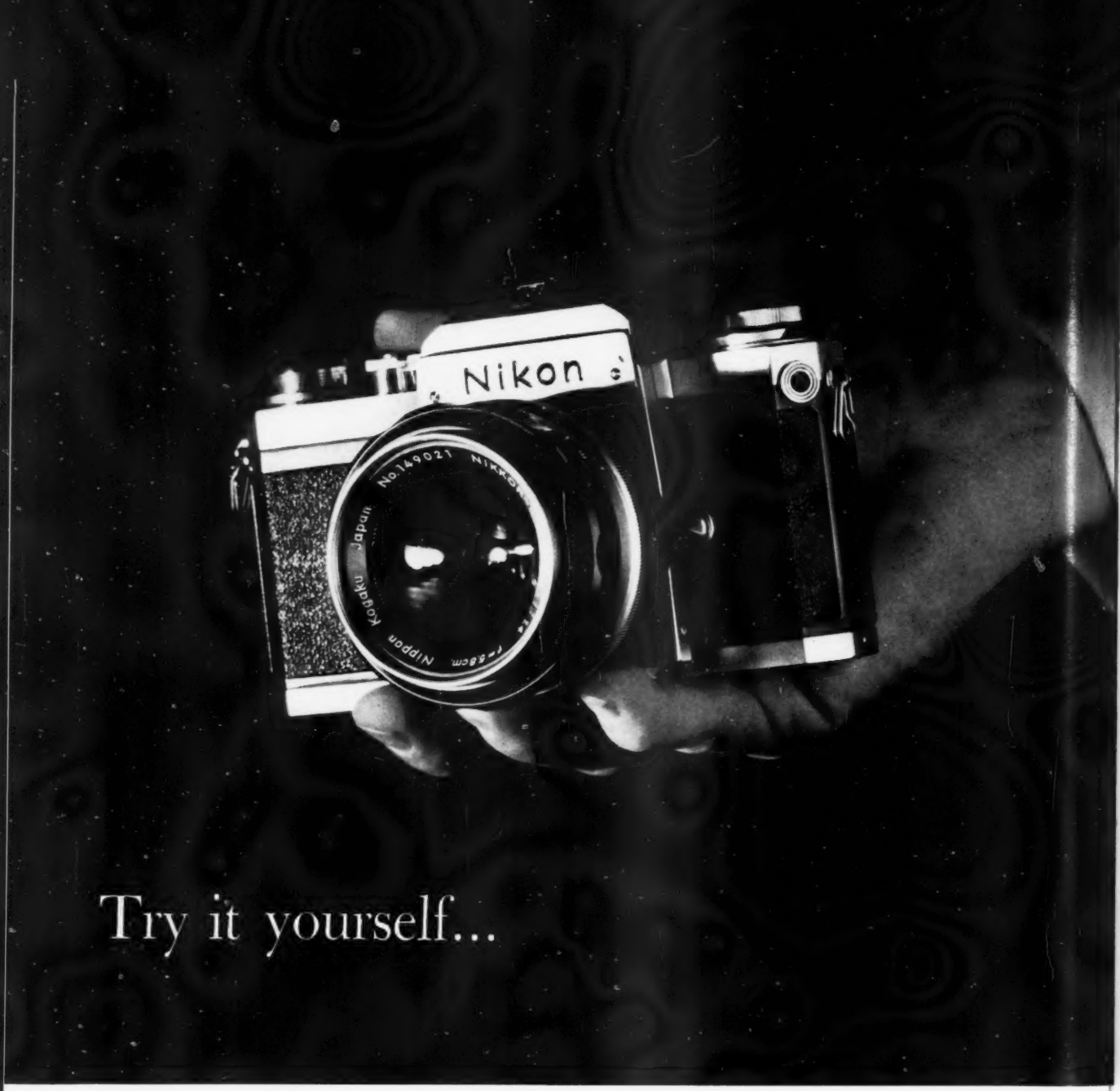

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AN EDITORIAL

NUTS AND BOLTS

We've seen too many exceptions to give full credence to what he says, but a friend who has been around a good many industrial photographers claims that they are just not interested in photography as a creative means of expression. ■ Well, even if he were right in his observation, he's wrong to some degree in thinking that in-company photography should necessarily be a creative means of expression. A police photographer documenting a finger-print, or a hospital photographer copying an X-ray film, or an industrial man recording a metallographic slide should be anything but creative or expressive in interpreting his material. He should show what's there; nothing more, nothing less. ■ On the other hand there are some seemingly routine jobs which could stand a little creativity. While we'd hate to see moody, low key or "selective focus" identification pictures, it seems to us in the case of many of them that if they were made by an operator with a slightly greater sense of artistry they would actually be more serviceable pictures. They would make it easier to identify the person. ■ Above everything else, the in-company photographer must do the photographic work that has to be done. ■ We think that the idea that all photographers should be creative, or all should be good fellows, or all should be young scientists, or all anything, is all wet. ■ It's a fallacy that many company managements engage in. They think a photographer is a photographer, and pay according to what the market will bear: usually very little. It's an error of observation that some photo managers permit themselves to make, hiring the same man over and over again to work his way up from bottle washing. Actually only one man may be needed to wash bottles, and there may be a crying need for another to breathe life into the house organ pictures, and another who's a whiz at technology but an artistic idiot. It's a mistake our friend makes. True, we'll never have enough creativity, but a lot of worthwhile things are held together with nuts and bolts.

The Editors

ARKANSAS FUEL OIL CORPORATION

Careful work and strict attention to detail are standard operating procedure in this small but well-managed department. Covering all facets of company operations in the south and southwest, the department is headed by Jim Hampson, a veteran fly-it-yourself photographer who started as an engineer with a passion for pictures

Small, neat and well-organized is an attractive description, whether it applies to a girl, a car or a photo section, such as the department run by James Hampson for Arkansas Fuel Oil Corporation in Shreveport, La.

Handling assignments in the south and southwest for this Cities Service subsidiary, the section consists of Hampson, who does most of the shooting; Ray Utt and Don Phillips, photo technicians; Mary Ann Flenniken, Recordak operator and Pamela Hall, secretary. Described by Hampson as a "commercial-type operation," a breakdown of work done shows that about 55 per cent of the pictures are record and documentary, 5 per cent are for progress reports and 5 per cent house organ work. The remainder is divided among public relations, safety, legal photography, product shots and aerial photographs. It is the type of diversified work load which puts a premium on versatility.

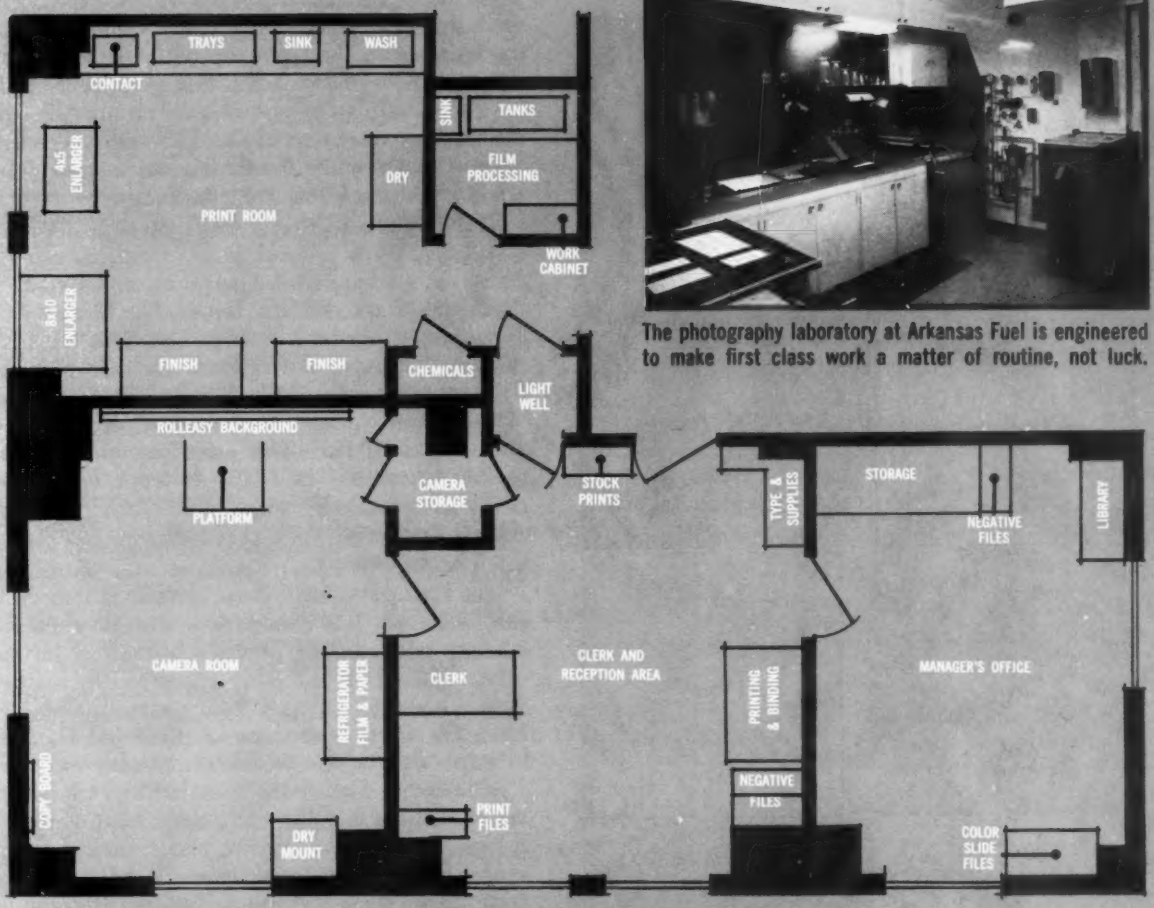
Jim Hampson started out as an engineer whose hobby was photography. As an amateur, he started making pictures of distillation towers strung with lights for night operation as field notes for his engineering duties. This engineering background is evident in the organization and mechanical innovations found in the section.

There is a work sheet for the department which indicates the maintenance assignments for the staff for each day of the week. It takes about a half hour done daily; ignored, it could cause serious loss of time and possible damage to equipment. For example, one man will be assigned to clean the air conditioning filters, another to fans, etc.

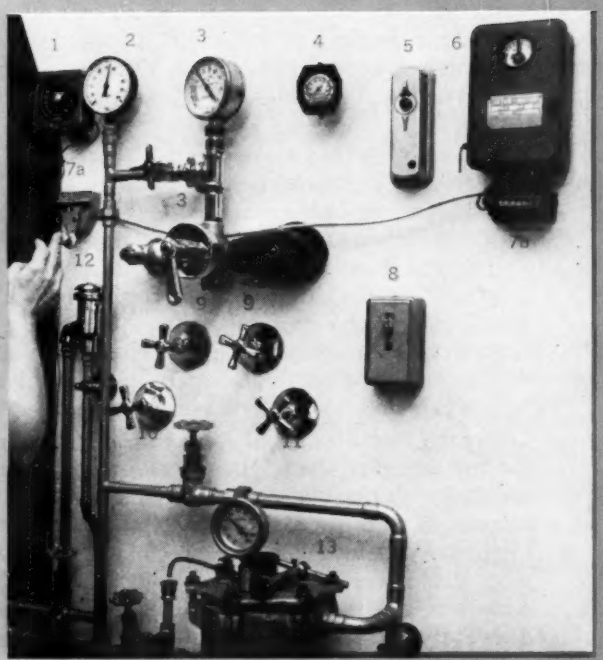
A strict rule is that everything that is not being used must be under cover. Sinks have covers which are mounted on piano hinges to fold back into the wall when the sinks are in use. Film hangers are neatly stored in a rack on a shelf under the developing sink. The darkroom literally gleams with glossy white walls and black floors and table tops.

Counters are used to keep track of the work done in the section. Four Veedor Root counters on the shelf in the film room keep track of negatives and replenishment. The counter has a long wooden handle which is pulled down by the darkroom man for each roll or sheet of film processed. When prints are placed in the washer, the darkroom man presses a telegraph key once for each print. The key actuates a solenoid which trips a counter. This system of counters provides a complete check of how much material was used.

Expendable items are numbered consecutively. The first can of developer purchased in 1959 might be numbered 9001; the 300th can, 9300. New stock is placed at the rear. Thus, by looking at the number of the can on the front, which might be 9201, Hampson can tell how much developer was



The photography laboratory at Arkansas Fuel is engineered to make first class work a matter of routine, not luck.

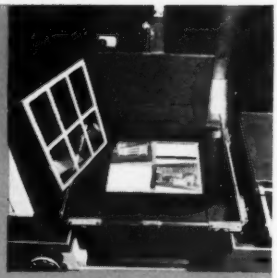


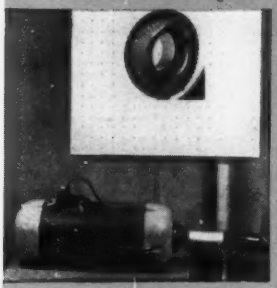
This panel provides exact temperature for all processing solutions. Three water supply systems are used; one for normal cold water (about 65 degrees F) and one each for hot water and ice water. Hampson designed this system for maximum flexibility and control. The willingness to adapt and innovate new methods and equipment is characteristic of this section, possibly a reflection of Hampson's engineering background, his profession before photography.

1 Wash temperature 2 Water pressure 3 Powers regulator 4 Room temperature 5 Air conditioning thermostat 6 Time clock for independent air conditioner 7a and 7b Print counter (hypo tray) 8 Dryer time clock 9 Cold water (variable) 10 Hot water (130 degrees F) 11 Ice water (45 degrees F) 12 Vacuum breaker 13 Water filter—miscellaneous piping and bypasses to pipe water to print or film room.

MULTIPLE PRODUCTION OF 4x5 CONTACT PRINTS

Contact printer is fitted with glass to permti four contact prints to be made simultaneously. Also on hand are glasses for 2¼ x 2¼, 3¼ x 4 prints.



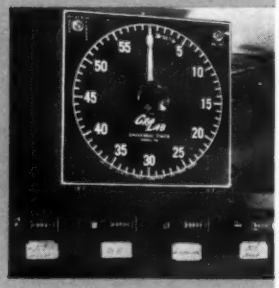


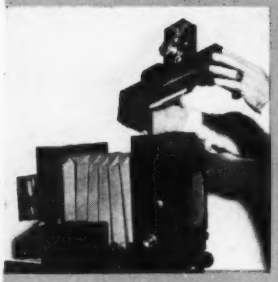
CLEANERS GIVE VACUUM FOR COPY WORK

This tank-type cleaner is hooked up to the copy board. It gives sufficient vacuum for copy work. Only continuous-tone is copied by photo section.

VEEDOR ROOT COUNTERS TALLY NEGATIVES

Four counters are used to keep track of number of negatives processed as well as replenishment rate. Accurate control is key to quality, efficiency.





TWIN CAMERA SET-UP IS USED FOR PORTRAITS

By placing an Argus on the portrait camera, both formal and ID shots can be made together. Section takes 300 to 500 head shots a year.

CASTERS PERMIT QUICK, EASY LAYOUT CHANGES

Puting equipment on casters permits better cleaning and easy layout changes should work requirements make rearrangement necessary.

SPECIAL MOLDINGS FOR PHOTO DISPLAYS

Specially-designed molding permits pictures to be changed periodically. This system is used for offices and reception rooms at the company.

used since the first of the year. A comparison of the number on the front can with that on the last can will show how much is left in stock. Supplies are coded with an inventory level number. Perhaps the number might be 12/4. This tells the user to order 12 units when the fourth one is used. Thus, adequate stock levels are maintained.

Although the section is small, there is an impressive list of tools to work with. Cameras range in size from a 16mm Cine Special to an 8 x 10 Deardorff with a set of Ektar lenses, 7½, 10 and 14-in. In between are two Rolleis, two Hasselblads, a 500C and a Super Wide; three 4 x 5 Graphics; 4 x 5 Graphic View and 5 x 7 View. There are also three 35mm cameras, a Contaflex, an Argus C3 and a Kodak Ektra. (This was Eastman's top quality 35 introduced in 1940. It went to war and never came back, a victim of post-war production costs.) For aerial work, there are two K-20s and a 5 x 7 aerial camera.

Jim Hampson, who does aerials, is one of the comparatively few cameramen who do their own piloting when taking pictures instead of hiring a pilot. (Robert Yarnall Ritchie is probably the best-known member of this fly-it-yourself club.) In 1944, the wartime scarcity of pilots led Hampson to learn to fly so that he could make his own aerial photographs. He finds that flying yourself is easier as there is no need for detailed directions to the pilot. Also, the lighter load makes the plane easier to handle at low (about 100 ft.) altitudes from which some pictures are taken. He now logs about 150 to 200 hours a year taking pictures of installations, possible pipeline routes, geologic formations, etc., all a part of the company's oil and natural gas production and refining operations. A slow, high-wing plane such as the Veronica is used. This type can be rented almost anywhere in the country.

Both color and black-and-white film is used. The color is sent by air to Meisel Photochrome in Dallas or to Photocolor in Houston for processing. Black-and-white is processed at the lab. All films, Tri-X, Verichrome Pan, Royal Pan and Super Panchro Press are developed in D-76, except for 35mm Plus-X which goes through UFG. About 80 per cent of the 4 x 5 work is done with film pack which is processed in sheet film hangers by snipping off the ends which hold the protective paper.

In each film development room there is a button for a buzzer alarm. If a photographer needs assistance during film processing, he rings the buzzer. Buzzers are also used on the double darkroom doors. Before entering the outer door, a person outside presses the buzzer. The person in the darkroom can then check to see that the inside door is shut. (*continued on page* 54)

MEMO ON:

PHOTO/REPRO ONE SECTION OR TWO?

With all the overlapping, it often takes a Solomon to decide which job goes where

If the number of different kinds of work done by in-company photographers and reproduction men presents a problem in arithmetic, then the permutations of organizing these functions in a company is an exercise for third-year algebra.

Seemingly there is a different way of dividing the photographic-reproduction pie in every company. Thus microfilming, for example, might come under the aegis of the chief photographer, the head of reproduction, the company librarian, the supervisor of drafting, the manager of office services, the director of engineering services, and engineering development group . . . the list is endless.

Basically however, the situation can be boiled down to two opposing philosophies, with most cases spread somewhere along the line between these two poles. Carried to its final ridiculous conclusion the first viewpoint would have a single department that united everyone directly or remotely connected with visual or printed communications. That would go for Varitypists, cinematographers, artists, scriptwriters, offset press operators and what have you.

Opposite to this is the specialist school of thought. Members include the PR photographer who would rather lose a toe than learn how to judge the quality of a blueprint; or conversely the expert in offset presswork for whom the aesthetics of photography are airy mumbo jumbo.

Persons falling into this second group—the specialists—feel that the division between photography and the reproduction processes is a gulf which is simply too wide to bridge. They feel a person can be good in one thing or the other, but not both. By extension, photography should be in one department and reproduction in the other.

The generalists, the visual communicators who hold for a unified department, also go along with this viewpoint—to some extent.

In one case, for example, the manager of a photographic and reproduction department is in charge of all graphics except presswork. Yet he divides his department into two sections. One section handles photocopying (with Photostat machines), diazo and blueprinting. The other section does still photography, process camera work, black-and-white and color processing. Within each of the two sections, the men rotate jobs. But no one from photography works in the reproduction section and vice versa.

While the photography section actually does some reproduction work, e.g. exposing and processing process camera negatives—the departments are entirely separate.

What's the point? This manager classifies the functions of his department into precision and production. He feels the attitude and qualifications necessary for camera work or silver-sensitive photograph processing are quite different from the attitude and qualifications necessary for running a photocopying machine or a diazo unit.

Yet he feels that the processes themselves are closely related. In fact relatively fine points of an economic or technical nature will decide whether a job is to be handled by blueprint, whiteprint, photo offset plate, photocopy or even a color transparency. And therefore photography and reproduction are too interrelated to be put asunder.

Getting down to specific cases, there are thousands of reasons on both sides of the question, "one or two departments for photography and reproduction?" We say thousands of reasons because there are thousands of departments.

Some are historical. In the beginning there was a void. Then engineering decided they needed an in-plant blueprint operation. Meanwhile, way at the other end of the plant, PR saw the need of a photo unit. Both grew in stature and in size and began to overlap somewhat. One is headed by a crackerjack reproduction man, whom engineering considers worth his weight in sliderules. The other is headed by a fine photographic administrator, all of whose loyalties lie with the PR department. As long as things are running smoothly, there simply will be no merger.

In other cases, the two departments started out together, but one of them got so big and so complicated they peeled off and moved to other quarters. The divorce was not only amicable, but, amazingly enough, it delighted both sides.

Sometimes a merger was concluded when it was seen that for the work at hand there simply was too much overlap to keep the departments separate.

Very often, the merger takes place on the second level of management where one general manager has supervision over both photo and repro sections. Quite often, this manager is not a specialist in either field, but a trained administrator, perhaps coming out of the firm's executive training program.

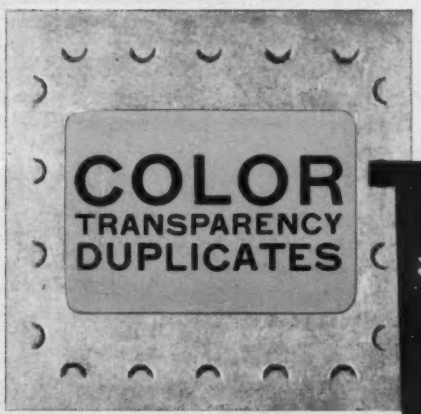
From what we have been able to observe, we have come to the conclusion that the only safe place to stand is squarely in the middle.

A unified department is good if its management sees the value of each of the functions, and does not defer to one while sitting on the other. This might take the wisdom of Solomon, but many of the managers we've seen at work seem to have it. Separate departments are good if each department is able to work without jealousy or duplication, and still keep active, progressive management at the helm of both groups. This requires wisdom on the part of two people.

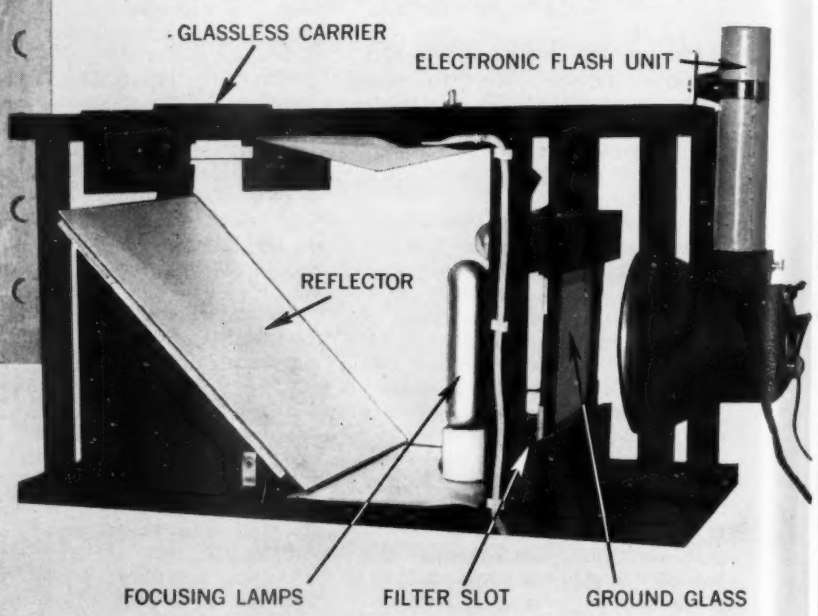
In either case, there is an overlap of function. Somehow, there must be teamwork.—THE END.

GEORGE WARD'S
SLIDEMAKING METHODS

George Ward makes slides for television and audio-visual use with 35mm copying equipment. Employing the methods described here, less a trade secret or two, he has parlayed a shoestring into a six-figure business in little over a year. His major investment: a lot of talent and about $1000 worth of equipment, mostly store-bought



George Ward designed this transparency illuminator for making copies. Electronic flash unit has ideal color temperature, output and consistency, according to Ward. Although he designed flash unit shown, any good unit will do.



George Ward, long-time man about photography, was about to move his family from Denver to Chicago for a new job when one of his frequent brainstorms hit, just as he was thinking of how much he liked Colorado. He walked out of his bungalow, pulled the "for sale" sign from the clapboard and decided he was in business for himself.

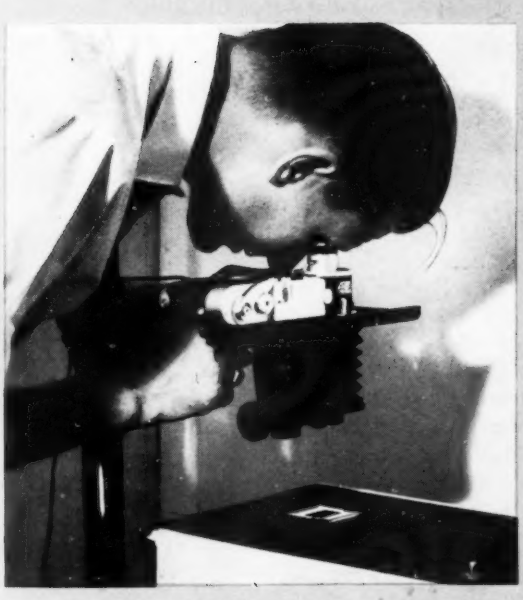
He had no customers, no capital, some equipment and an abundance of enthusiasm. He has more equipment and is still enthusiastic. His enterprise has grown in one year from a shoestring to a $100,000 gross.

Ward makes duplicate color and black-and-white slides for A-V use and television releases. He owes his success to his background in photography, his reputation and contacts—and luck; he landed some very big accounts very quickly.

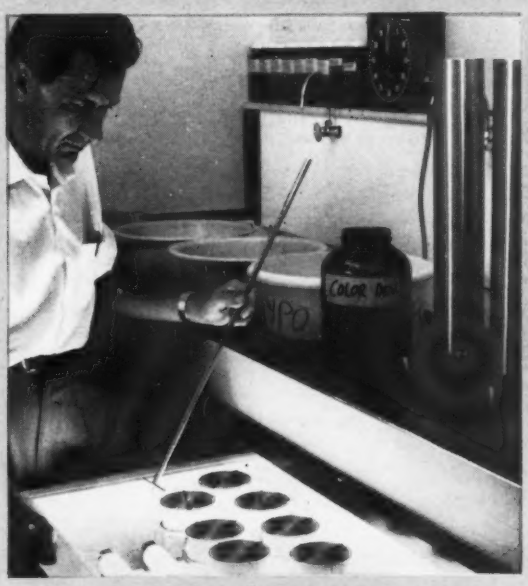
While he has no advice for scoring a financial success in a photographic specialty, he does think he has some valuable information about his techniques to pass on to in-plant photographers. This because many of them are faced with substantially the same production problems as Ward, and many have or can easily acquire the same equipment. In fact some of his work consists of handling overflow from in-plant units doing exactly the same work.

Ward's total investment in equipment is low, about $1000, exclusive of equipment already owned and used for other purposes, such as 35mm cameras. In spite of this, he is able to turn out black-and-white slides at the rate of about 700 per hour (or 1000 color slides per day) with the help of the two persons. Furthermore, he is able to offer custom services such as reduction or enlargement, cropping, color correction, or aiming black-and-white transparencies either for the projector or the TV camera. Specialized finishing equipment can out-pace Ward's set-up, but it is simply not designed to accommodate the special needs that he satisfies for his customers.

Almost without exception, Ward supplies 35mm slides in cardboard mounts. The input is not nearly so standardized. It includes just about everything except original photography—artwork, photographic prints, color transparencies, of nearly every size, color prints, color negatives, black-and-white negatives—whatever the customer sends in.



Copying equipment includes stand from Valoy (Leica) enlarger and Reprovit focusing stage. The slides are mounted in glassless negative carriers to reduce dust.



Color film, either Daylight Anscochrome or Anscochrome Duplicating Film, Type 544, is processed on Nikor reels. Drawer is lined with fluorescent tubes.

Although he's seen a thousand and one very similar units, Ward felt he had to design his own transparency illuminator for making duplicates of color slides and negatives. His finished unit (page 32) illustrates all the principles he feels are essential. The illuminator begins with an electronic flash head. This is the ideal light for transparency copying, Ward feels, because of its intensity, color quality and consistency, its tendency to fight the build-up of contrast in dupes, its economy and convenience. Any unit produced by a reputable manufacturer would do, he says, but he adapted a special one with an electrical engineer's help to provide sufficient intensity along with a short recycling time. It's a 200WS outfit.

Immediately in front of the flash unit is a sheet of ground glass for diffusing the light source. Next comes a filter slot. Anyone embarking on color duping might just as well buy a complete set of color printing filters in yellow, magenta and cyan—according to Ward—because sooner or later he's going to have need for each of them. Kodak CP filters or Ansco Printon filters are equally suitable. They come in graded densities from .025 to .50. Besides these filters Ward uses an ultraviolet filter (UV16P) and a conversion filter for every shot, whatever the correction with the color printing filters. In Ward's case, the conversion filter is an 85B to convert 3000K film for use with 6500K electronic flash. A fine adjustment is made for each new emulsion batch with the CP filters which cost about $10.

Cutting and mounting operation is mechanized. Output: 700 per hour.

Arrayed next to the opening in front of the filter slot are the focusing lamps, three medium intensity bulbs which have no significant effect on the exposure which Ward says should be turned off during the exposure itself. He uses Sylvania Showcase lamps.

The next essential in the light box is space, namely, a space of at least a few inches between the light source and the reflector which bounces the light up through the transparency. The space helps in two ways. As could be demonstrated with Euclidean geometry, it evens out the illumination over the transparency and permits the system to supply more nearly parallel light to the transparency. In theory this should end up in more evenly exposed, sharper-looking copies. Ward feels his results are proof of the pudding.

The reflector Ward uses is almost ideal, he feels, and is quite cheap. It consists of an unexposed, fixed-out sheet of matte Kodabromide paper mounted on a stiff support. Ward says it's the whitest diffuse reflecting surface he can think of short of a titanium dioxide coating.

The transparency stage is another hybrid. Ward uses glassless negative carriers mounted on plywood masks he made. They hold the transparency firmly, are easy to change, help lick the dust problem and incidentally cut out stray light. Ward eschews an opal glass stage, feeling that it diffuses the light too close to the transparency, leading to a loss of sharpness.

For even sharper looking results Ward has been tinkering with colimated microscope lighting, but this leads to problems with contrast and dust; he's not ready to talk about it yet.

For his copying equipment, Ward has settled on store-bought units. He uses a stand from a Leitz Valoy enlarger (about $50) and a Reprovit focusing stage (about $100) with one of his Leica M3's. The Reprovit is a rack-over device for the Leica body with a ground glass focusing screen. He uses a Leica 30X magnifier ($24) and focuses on the aerial image in the clear center of the screen. He uses a 50mm Focotar f/4 (thinks highly of the Elmar f/3.5 or the Micro Nikkor f/3.5) for copying work.

Ward has settled on two films for his color transparency dupes: Daylight Anscochrome and Anscochrome Duplicating Film Type 544. (It's the latter for which he uses the conversion filter.) Anscochrome has the edge for speed and consistency, Ward believes, and the Duplicating film is superior for economy. It's about one-fourth the cost. The speed might be a factor in economy, however. Ward guesses that a 50WS unit would be sufficient for Anscochrome Daylight, but he needs his 200WS job for the Duplicating film.

When he's making color slides from Ektacolor or Kodacolor negatives, Ward loads up with Ektacolor Slide film which he cuts into 36-exposure lengths from the 100-ft. rolls in which it is supplied.

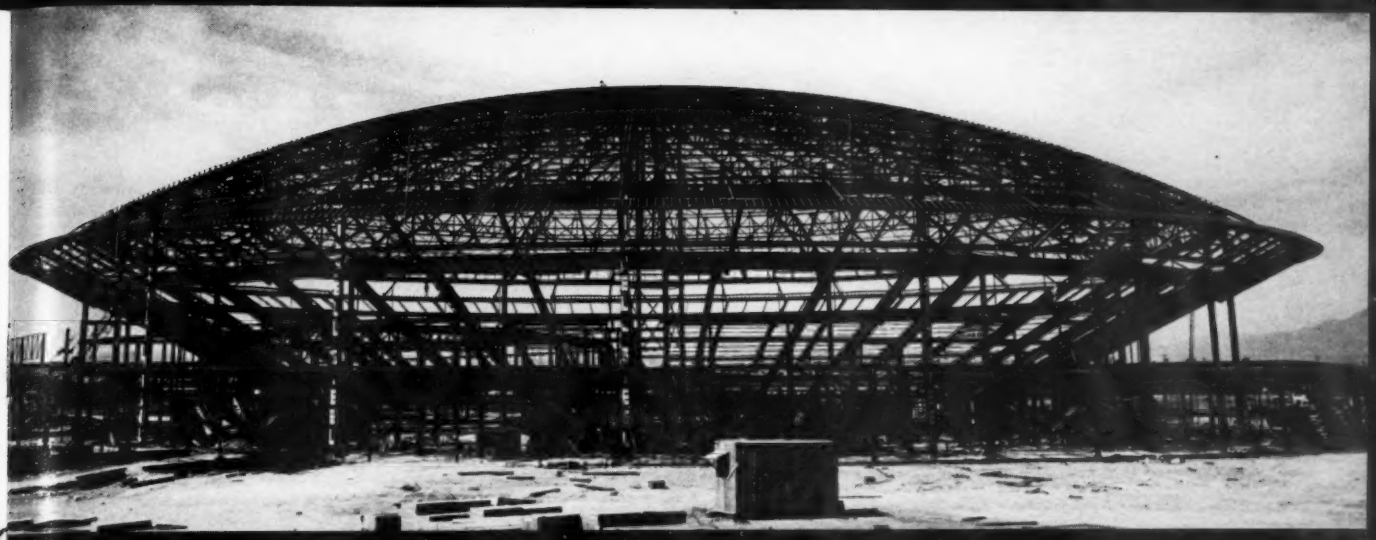
When he began, Ward used a densitometer to determine exposure. Now, thousands of duplicates later, he finds that his assistant's judgment outperforms the densitometer.

Ward processes his color dupes for decreased contrast. He advises cutting down the development in the Ansco first and color developer to 12 min. each. Actually he uses a pet, secret formula for first developer which (*continued on page* 72)

Television grid *(above)* is placed on focusing head of stage. Ward uses Panatomic-X for all work, line or continuous-tone, at exposure index of 160. Contact prints are made on Gevaert Fine Grain Positive. Slides for TV must have tone throughout.

Copy to be photographed is projected on stage, making framing easier and permitting focusing on baseboard. Copy negatives are contacted printed *(above)* with Color Contact printer (Karl Heitz) hooked up to photo timer and productometer.

PORTFOLIO NO.26

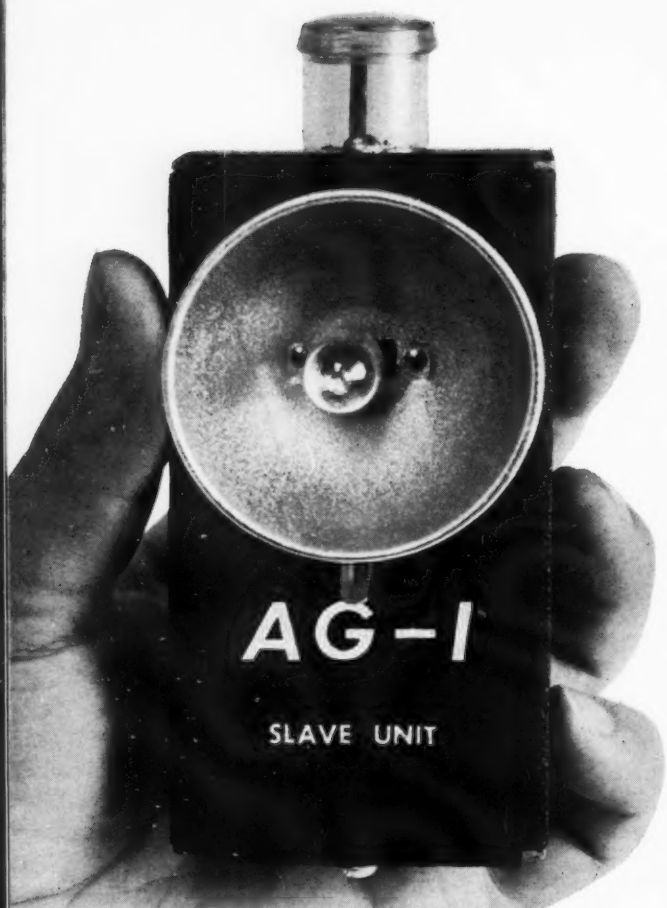


THIS STORY MIGHT BE CALLED THE THREE HATS OF KEN KNOLLENBERG. IN HIS WORK FOR BETHLEHEM STEEL'S PACIFIC COAST DIVISION, HE WEARS ONE HAT LABELED ADVERTISING, ONE FOR PUBLICITY AND YET A THIRD FROM PUBLIC RELATIONS. WORKING MOSTLY WITH A NIKON AND A KALLOFLEX, HE TURNS OUT FIRST RATE PICTURES NO MATTER WHICH HAT IS ON THE HEAD. IT IS THIS WIDE RANGE WHICH MAKES "INDUSTRIAL CAMERAMAN" SO INADEQUATE A LABEL.

Steel framework of Greek Orthodox Church (left) in Oakland was made with Nikon, Panatomic-X and a 28mm lens. The camera was flat on the ground with the delayed-action doing the button pushing. The skeleton that looks like a clam (top) is the auditorium of the Las Vegas Convention Hall, made with a Nikon. The new *SS President Lincoln* has her rudder attached ⟶ at Bethlehem's San Francisco yard. A Nikon camera and Plus X Pan were used for this shot.

The San Francisco Bay Bridge at dusk was an advertising shot made with a 4 x 5 Sinar View. Construction at Glen Canyon (right) shows the insertion of a 12 ft. bolt used to retain the sandstone walls of the canyon. A Kalloflex was used. This assignment cost Knollenberg two cameras due to the abrasive action of the sand.

The Dave Brubeck house *(left)* was photographed with the Sinar View camera as part of an ad campaign to get architects to use steel. The worker *(below)* is pulling steel wire apart to see how strong it is. This Kalloflex shot was made at Bethlehem's Wire Mill.



Every photographer should have a slave or two around the place. The trouble with most units is the high cost of convenience. Here is a simple, easy-to-make light which takes only a few hours of time and less than $20 in parts. Using the tiny AG-1 bulb, it packs a powerful punch in a small package. Words and pictures by Jim Goss. Unit by you, the reader

One of the most useful, and simple, do-it-yourself projects is this slave unit using the tiny AG-1 flashbulb. The circuit diagram for this low-cost, transistorized unit was originally published in *What's New,* a General Electric trade paper. At present, there is nothing like this unit on the market which uses the AG-1.

The unit consists of a photoelectric cell and a transistor that amplifies the current through a relay. When the current reaches seven milliamps, the relay closes, discharging a BC unit into the flashbulb. A 20 microfarad, 6-volt capacitor and a 10 K resistor are added to the basic circuit so that the unit will not flash by itself. The unit is triggered by a pulse of light.

Two minor changes were made in the circuit of the unit shown here. An SPST slide switch was substituted for the off-on lock-out switch used in the General Electric experimental model and a push-button miniature switch was added for open flash use. If the open flash is not desired, the latter switch and related wiring may be ignored.

The brighter the surrounding illumination, the shorter will be the distance at which these units will work. When made with the components listed here, an AG-1 bulb (rated at 7,000 lumen seconds) will trip one of these slave units from a distance of 12 ft. in normal room lighting. Under very low light levels, the units can be actuated from about 25 ft. Using a No. 5 bulb (16,000 lumen seconds) will substantially increase the distance from which the slave unit can be actuated.

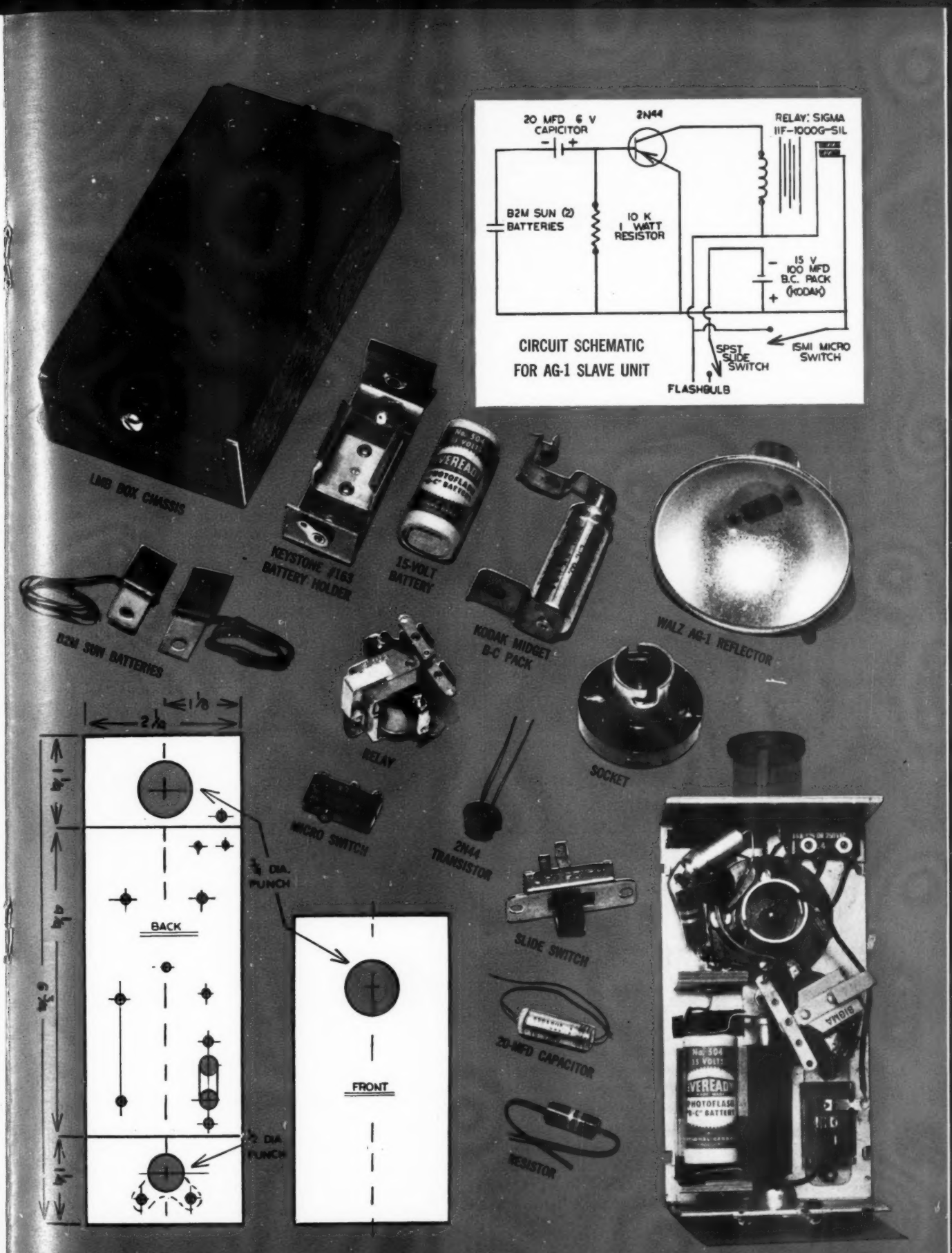
Double the distance

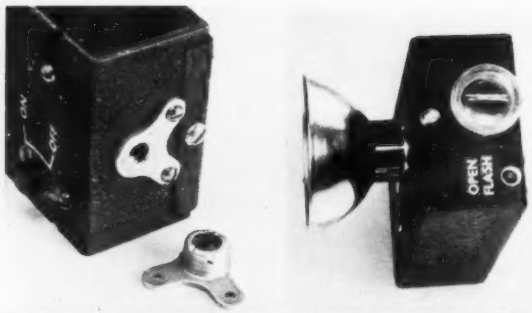
The working distance could be almost doubled by using a relay with a 250 ohm resistance and a pull-in of four or five milliamps. However, if you want a slave unit with such sensitivity, you will have to wind the coil yourself. The relay listed here, SIGMA 11F-1000G-SIL, with a 1000 ohm resistance and a seven milliamp pull-in appears to be the most suitable for this particular application.

These units will synchronize up to 1/30 sec. on X or F settings and to 1/125 on M. This is sufficient synchronization for most situations encountered under normal conditions.

When the flashbulb is removed, the transistor is disconnected to save the battery. When the slide switch is in the "off" position, the unit is completely inoperative.

The LMB box chassis lends itself to this project. The size and shape are ideal for accommodating the necessary components and the aluminum construction offers light weight and easy working. The complete unit measures 4¼ x 2¼ x 1¼ in. The Sun batteries protrude about ¾ in. and the Walz Reflector Adapter is 1½ in. Total weight of the


20 MFD 6 V CAPICITOR
2N44
RELAY: SIGMA 11F-1000G-SIL
B2M SUN (2) BATTERIES
10 K 1 WATT RESISTOR
15 V 100 MFD B.C. PACK (KODAK)
CIRCUIT SCHEMATIC FOR AG-1 SLAVE UNIT
SPST SLIDE SWITCH
ISMI MICRO SWITCH
FLASHBULB
LMB BOX CHASSIS
KEYSTONE #163 BATTERY HOLDER
15-VOLT BATTERY
B2M SUN BATTERIES
KODAK MIDGET B-C PACK
WALZ AG-1 REFLECTOR
RELAY
SOCKET
MICRO SWITCH
2N44 TRANSISTOR
SLIDE SWITCH
20-MFD CAPACITOR
RESISTOR
BACK
FRONT
¼ DIA. PUNCH
½ DIA. PUNCH



Bottom view *(left)* showing tripod socket which is optional. Top view *(right)* shows photo cell. Listed below are required parts needed in the AG-1 slave unit:

REQUIRED PARTS

1. LMB Box Chassis No. 101	$ .87
2. SIGMA 11F-1000G-SIL relay	1.75
3. Sprague TE1090 20-mfd 6v capacitor	.79
4. GE 2N44 transistor	2.90
5. B2M Sun Batteries (2 ea @ 1.50)	3.00
6. Resistor, 10,000 ohm, 1 watt	.18
7. Switch, Micro 1SM1	1.00
8. Switch, SPST slide	.10
9. Keystone No. 163 Battery Holder	.23
10. Kodak Midget B-C Pack	1.50
11. Eveready No. 504 15-volt battery	.81
12. Single contact candelabra socket	.55
13. Walz AG-1 Reflector Adapter	1.49
14. Miscellaneous machine screws; No. 22 wire (12 in.), No. 22 tubing (6-in.), ¼ x 28 nut plate. Estimated cost $15.17*	

*Prices are approximate, varying in different sections of the country.

unit, including battery, is a little over six ounces.

The components should be placed in the chassis with care. Each part should be positioned correctly and the mounting holes marked and drilled accordingly. The Keystone No. 163 battery holder has no mounting holes, so these can be placed and drilled at the discretion of the builder. Once the positions are properly located, there is little room for adjustment in case of misalignment. For this reason, no measurements other than overall dimensions are given in the chassis schematic. This schematic is only intended as a guide. Check with the individual components for correct position before drilling the mounting holes.

The hole at the top of the chassis for the Sun batteries and the one in front for the Walz Reflector Adapter are made with a ¾-in. round chassis punch. The ½-in. hole at the bottom is for reverse mounting of the ¼-28 nut plate, retapped for ¼-20. If this improvised tripod socket is not desired, there is no need for the ½-in. hole.

Batteries back to back

Two B2M Sun batteries are mounted in series back-to-back to give bilateral sensitivity. The slave unit can then be placed either to the left or right of the master light source. The protruding Sun batteries are protected by enclosing them in a section of ¾-in. clear plastic tubing which fits neatly into the hole cut in the top of the chassis. The tube is cemented in place and plugged with a clear plastic cap.

The relay (SIGMA 11F-1000G-SIL) specified is not insulated and the box chassis itself is therefore positively charged by current from the 15-volt battery in the BC pack. In order to prevent shorting, it is important to insulate all negative outputs from any contact with the chassis proper, or the battery holder. This is done by wrapping the BC pack capacitor (and insulating all other possible points of contact) with ordinary black photographic masking tape.

The Walz AG-1 Reflector Adapter is removable for more compact storage. The candelabra socket, which is a permanent part of the unit, can be used for firing a bare No. 5 or similar flashbulb should the need arise.

A tripod socket, when added to the base of the chassis, will greatly increase the potential uses of the unit. In the unit shown here, a ¼-28 nut plate was retapped to accept the standard ¼-20 tripod thread (American standard). This enables the unit to be used on a tripod by means of any one of several inexpensive clamps now on the market, or by using a light stand.

Three of these AG-1 "midget slave" units and a case (144) of AG-1 bulbs have a total weight of about two pounds. The entire lighting package requires only about 144 sq. in. of storage space. Compare this with the size and weight of the equivalent in No. 5's.

Modified circuit

The circuit shown here is a modification of the original circuit, offered by General Electric as an alternative design. In the original circuit, 150 f.c. of light would flash the bulb. This circuit requires a pulse of light. The 20 microfarad capacitor takes care of this. In the original design, which can be built for less money, two BM-2 solar cells are specified. These cells have been retained in this circuit although the "deluxe" GE circuit uses a silicon cell.

These compact units have many uses, as a complete lighting system for candid work or for strategically-placed fill-in lights where cables would be impractical.—THE END

RESEARCHER'S REPORT

Water, water everywhere—but is it safe in the photo laboratory? It pays to be in the know about H-two-O

Sparkling water from the tap is often far from pure as many discover when sludge, fogging or stains appear on their films. One of the best ways of guarding against impure water is knowledge of how it becomes contaminated and what you can do about it.

The possibility of your laboratory receiving water containing photographic active materials would depend on whether your water is from a surface or ground supply and on the treatment given to the liquid before it reaches your laboratory.

With the exception of distilled water, water melted from ice, and rain water, water can contain dissolved salts such as sulphates and bicarbonates; gases, particularly oxygen; suspended organic and mineral particles, and organic extracts from decayed vegetation. Usually, however, most of the suspended particles are filtered out of public water supplies and chlorination is added to destroy harmful bacteria. The public water used by many processing laboratories is safe for most photographic usage.

Distilled water

The major exception to this is the required use of distilled water when stock solutions are being prepared from the salts of the precious metals such as silver and gold and when mixing certain dye solutions.

A recent Department of the Interior survey showed that over 8 per cent of the water supplies sampled received no treatment whatsoever. Many laboratories have their own supply which may or may not be treated.

A chemical analysis of the water supply does not usually indicate its photographic activity. The known hardness of the supply, along with the amount of solids, especially sulphides and iron, is useful but the best test is an actual processing run to determine malprocessing effects and residual scum after drying. Analysis information regarding the public water supply in your area can be obtained from *The Industrial Utility of Public Water Supplies in the United States,* published by the United States Government Printing Office, Washington, D. C.

Hardness

Probably the word you hear most in connection with water, especially in color processing, is hardness. Hardness is commonly referred to as the amount of calcium or magnesium present in the water supply and is usually expressed as the equivalent parts of calcium carbonate per one million parts of water (ppm).

Public water supplies range from 5 to 700 ppm and certain water supplies have been known to exceed this limit. In photographic work we are concerned with the natural hardness of the water but many industries break this down into temporary and permanent hardness. Temporary hardness is due to the bicarbonates of calcium and magnesium and will precipitate out as calcium carbonate on boiling. Permanent hardness is usually due to the sulfates of calcium and magnesium which are usually not precipitated by mere boiling. The terms carbonate and noncarbonate hardness are roughly equivalent to the terms just described.

In domestic use, hardness is noticeable by the difficulty in obtaining suds or lather. Everyone is concerned, in varying degrees, about scale deposits in hot water pipes, heaters and boilers. Because of this, commercial water softeners are used extensively in many areas.

In photographic processing, however, excessively soft or hard water is not desirable and can be harmful to the product. The optimum hardness for processing is from 150 to 300 ppm. Softer water than this will cause excessive swelling of the emulsion and can result in reticulation and susceptibility to physical damage.

Harder water can produce a white precipitate or sludge which, while not photographically harmful, can cause a powder to form on the dried product. As filtration does not remove these salts, it may be necessary to incorporate the use of a water softener such as Zeolite or in the opposite case to harden the water by the use of a commercial additive to bring your water supply within the required limits.

There are other impurities which are not removed by filtration, particularly organic materials and gases. Oxygen, as a gas, is the most common impurity in water. It is sometimes added by process of aeration during the purification of public water supplies.

Oxygen can be removed by boiling or by treatment with sulphite which is why some formulas for developers call for the addition of some sulphite to the solution before the developing agent is added. The gases in a solution can collect on the film and cause air bells which can prevent development in local areas.

Rule of thumb

Chlorine, which is sometimes added to water to destroy bacteria, is usually present in such small concentrations that it has little or no photographic effect. An old rule of thumb states that if it is safe to drink it is photographically harmless.

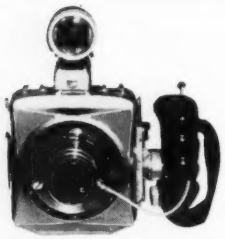
Water is tasteless and colorless, although it may appear blue in thick layers. Your water supply may have some taste from pollution, dissolved air and carbon dioxide, or growths of the algal type and dissolved vegetable extracts. Vegetable extracts can discolor processing solutions upon mixing but generally precipitate on mixing and have little or no photographic effects. But, if present in the wash water they can cause stain.

In many cases extracts can be removed by an activated charcoal filter. Organic particles can be of vegetable or animal origin and in colloidal form escape most filters. Some public water supplies using sand filtration add a coagulant, such as alum, to settle out colloidal materials and micro-organisms. If they aren't removed these materials can coagulate in the developer after mixing and form a slime or precipitate in the tank. Usually in a suspended state they have no harmful

(*continued on page* 76)

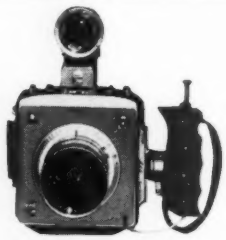
PHOTOKINA 1960

The big news at Photokina this year involves a tiny bit of equipment called a photo-resistor, making possible compact, new exposure meters whose accuracy and sensitivity rival, if not surpass, that of many present handheld meters. They may open the way to more complete automation, with every camera having its own coupled meter. Apart from the new meters, this year's show repeated the triumphal march of the single-lens 35mm reflex with improved versions of many old favorites. A new name joined the 8mm movie world as Leitz unveiled two new cameras, along with many new models featuring zoom lenses. The ultra-miniature family now has six new members, from Japan, Switzerland, Germany and Czechoslovakia. Lens speeds continued to inch upward with Canon's new f/0.95 lens taking this year's blue ribbon



Linhof Wide-Angle 65

This is a non-rangefinder camera with a permanently-mounted 65mm f/8 Schneider Super-Angulon lens in a Compur shutter with speeds to 1/500 sec. Focusing range is from 3 ft. with click stops at 3, 4½ and 9-ft. distances. The camera back is a Super Rollex holder making 10 exposures on No. 120 film in the new Linhof size which has the same proportions as 4 x 5. The camera has an adjustable anatomical grip, two accessory shoes for exposure meter and spirit levels, a rapid wind lever for the film housing and accessory sport or optical finders.



Linhof Press 61 2¼ x 2¾

This is also a non-rangefinder camera from Linhof with bayonet mounted interchangeable lenses, each in its own shutter. The shutters are automatically cocked when the film is advanced. Lenses available, all from Zeiss, include 53mm f/4.5 Biogon, 80mm f/2.8 and 180mm f/4 Tele-Arton, in Compur shutters. Normal, wide-angle lenses focus from 2½ ft. Camera takes either 10-exposure back (on No. 120 film) or 50-exposure back (on 70mm film). Camera has frame sportsfinder or multifocus finder, plus two accessory shoes for exposure meter and flashgun.

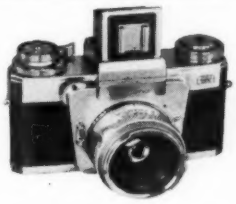
Plaubel Polaroid 3¼ x 4¼

This is the companion of the Brooks Veriwide, which instead of using No. 120 film, uses Polaroid film. The lens is a 65mm f/8 Schneider Super-Angulon in a Compur shutter. The focusing mount permits focusing from 3½ ft. The camera has two spirit levels, one vertical and one horizontal. A special optical finder supplied by Leitz takes in the 90° angle covered by this camera. This is slightly less than the angle covered by the No. 120 model which is said to be 100° based on the diagonal of the 2¼ x 3¼ negative.

SINGLE LENS REFLEX: WINNER AND STILL CHAMPION

Praktica IVB 35mm Reflex

This traditional waist-level camera has now become an eye-level prism reflex. The prism, however, is non-interchangeable. There is also a built-in, but not coupled exposure meter. The focal plane shutter has speeds from 1/2 to 1/500 sec. The standard lenses are semi-automatic (must be recocked to full aperture after exposure). Available are 50-mm f/2.8 Tessar and 50mm f/2 Pancolor. A model of this camera without the exposure meter is available. This is a sister of the more expensive Pentacon, the lenses of which use the same mounts as Praktica lenses.



Contarex Special 35mm Reflex

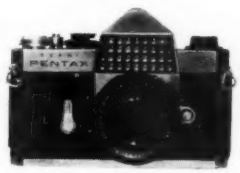
This is a simpler version of the Zeiss Contarex, substituting interchangeable waist- and eye-level finders for the built-in exposure meter. While there may be some loss in operating convenience, we suspect that among in-plant people, this model will prove more popular. In all other respects, it is the same as the Contarex, with focal plane shutter to 1/1000 sec., rapid wind, automatic lens diaphragms and all the other deluxe tidbits found on this camera. Available lenses include a 50mm f/2 Planar, a 58mm f/1.4 Planar and an upcoming 50-mm f/2.8 Tessar.

Malik Reflex 35mm Eye-Level

Equipped with zoom f/2.8 Zoom-alik semi-automatic lens with focal lengths from 35mm to 75mm. Focal plane shutter, speeds from 1/35 to 1/500 sec. Non-focusing viewing screen with central ground glass focusing spot. Camera has rapid rewind crank and two-stroke rapid wind lever which is pulled toward the user. Semi-automatic lenses, as on this camera, must be cocked manually. However, they stop down automatically as the picture is taken, after which they are recocked with the lens opening up to full aperture for viewing and focusing.

Pentax Spot-Matic

Outwardly like the Heiland Pentax H2, this camera has several new features including a bayonet lens mount replacing the screw mount. Most newsworthy, however, is a small cadmium sulphide, mercury-battery-powered exposure meter coupled directly with the shutter speed dial. The meter covers a narrow angle and reads directly through the lens on the camera. Changing the aperture or shutter speed will match needle of meter with notch for correct exposure. Lens is f/1.8 Auto-Takumar. Focal plane shutter speeds to 1/2000 sec. Also has auto-return frame counter.



Pentax Metalica 35mm Reflex

Unlike its brother Pentax, the exposure meter built into this camera is right out front. Instead of reading through the lens, it reads directly, covering an angle equal to that of the normal 55mm lens. Its operation involves matching needles within the viewfinder while changing shutter speeds or lens openings. Camera has an all-metal (hence its name), fast-traveling focal plane shutter with speeds from 1/1000 sec. Shutter is X-sync'd for electronic flash at 1/125. Lenses are in bayonet mount interchangeable with those for the Spot-matic. Lens is f/1.8 Auto-Takumar.

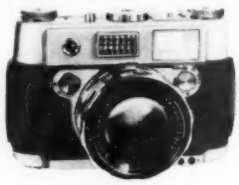
Pentax S3 35mm Reflex

Last in the trio of new Pentax models, the S3 is an improved version of the current H2 which will be continued. The S3 has a fully-automatic diaphragm which reopens instantly after exposure (the H2 must be recocked by hand after each exposure). The focusing screen of this, as of the other two new Pentaxes, contains an unusual grid which gives an aerial image. When you are out of focus, the image is blurred and double. When you are in focus, there is one sharp image. Camera retains screw-mount for lenses. There is a cloth focal plane shutter with speeds to 1/1000.

THE EYES HAVE IT—REFLEX SWINGS AND TILTS

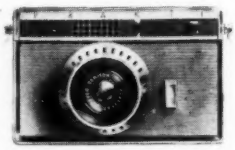
Canon 7T 35mm

Bearding the lion in his den, so to speak, the Japanese manufacturers have come over to Photokina to compete on home grounds. Among the expeditionary forces is the Canon 7T with a built-in exposure meter coupled to the shutter dial. It also offers a special breech-lock rapid change lens mount, the inside of which is threaded for Canon and Leica lenses. The revolving telescope finder has been replaced by a universal range-viewfinder with frames for 35mm to 135mm lenses. The finder is parallax corrected. A 50mm f/0.95 lens will shortly make its appearance for this camera.



Robot Royal 35BL 35mm

For almost 25 years, give or take a couple, the Robot has occupied a unique place in rapid sequence cameras. It is the only 35mm rangefinder model which is designed for this type of work, with a motor providing up to 20 exposures singly or bursts of 5 exposures per second. The shutter is a guillotine-type, from 1/4 to 1/500 sec. Standard lens is 50mm f/1.9 Schneider Xenon. This model has a built-in, noncoupled exposure meter and bright frame finder for 35mm, 50mm and 85mm lenses. Other lenses available include 28mm and 135mm.

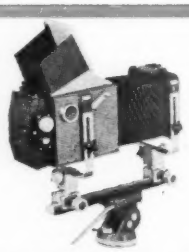


Prakti 35mm Electric Camera

This camera has electric drive which enables the user to make one shot every 3 sec. by holding down the shutter release. A small 3-volt battery powers the unit, with a capacity of 600 exposures. Simplified settings indicate portrait, group, landscape and action speeds, 1/60, 1/125 (group and landscape) and 1/250. Built-in exposure meter sets f/4 40mm Meyer Dormiton lens automatically. A lock stops motor action after 20 or 36 exposures have been made. There is a rapid rewind on the base of the camera.

Rollei Magic 2¼ x 2¼ Reflex

This newest Rollei reaches new heights in automation, having an electric eye that all but finds a subject for the user. The chassis is the basic Rollei T, except that the lens is now a 75mm f/3.5 Schneider Xenar and the shutter is a Prontormat S (instead of a Tessar and a Compur). Film transport and shutter cocking are crank-operated as with all respectable Rolleis. The two small setting wheels in front, however, are different. One sets the camera for time exposures, automatic and flash; the other focuses the lens. If necessary, the electric eye compensates for filter density.



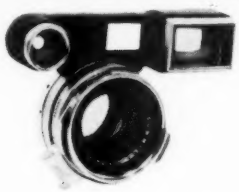
Arca Reflex 2¼ x 3¼, 4 x 5

These Swiss cameras are all-metal single-lens reflexes with focal plane shutters from 6 to 1/1000 sec. They accept a variety of lenses on interchangeable lens boards and can be adapted to studio use by putting the camera housing on the back of a monorail view camera. These cameras use roll film, cut film or film pack accepting interchangeable film backs. The focusing hood slants backward for greater convenience. This is an unusual looking camera, but useful for the studio, portrait or scientific photographer who prefers working with larger formats.

Edixamat Reflex C and D

The Edixas now have a rapid-return mirror and a fully-automatic diaphragm. A line of new lenses is available; 28mm f/4, 35mm, f/3.5, 50mm f/1.9 and 135mm f/3.5. The older lenses will also work on these two new models. The Model C has a built-in exposure meter with dual sensitivity. The Model D has no exposure meter but offers shutter speeds to 9 sec. Both models have a film wind warning flag in the viewfinder and a removable rangefinder. These cameras offer a variety of camera-lens combinations with optics made by Schneider, Isco and Enna.

LEITZ' SMALL SURPRISES, LINHOF'S IDEAL



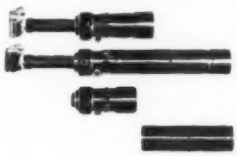
35mm Summilux f/1.4

Leitz offers the following facts on its new wide-angle Summilux f/1.4: Minimum aperture, f/16. Type, Gauss double lens. Seven elements, 5 groups. Angular field: diagonal, 64°, horizontal 55°, vertical 38°. Mount: parallel (non-rotating) focusing, couples to rangefinders and parallax-compensated frames of Leica M2 and M3's. Aperture scale, linear with equal spacing between all stops, click stops at each aperture and half-aperture. Filter size, Leitz E41 screw in 41mm. Available in bayonet for M2 and M3, M3 has viewfinder attachment. Focuses to 25 in. (M3) or 40 in. (M2).

Cine Rollex Back

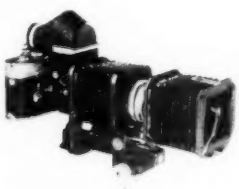
Linhof announced an expanded line of products for its "Ideal Format" 56 x 72mm 70mm back. Besides the 50 exposure cassette loaded Cine Rollex Back for Linhof cameras, there are cassettes, bulk loading apparatus, developing reels, tanks, color slide projectors and talk about equipment for everything right up to color enlargements.

It is possible that in the future, 70mm will replace No. 120 as the large roll film size, combining the easy transport and large load capacity of 35mm with advantages of a larger negative size.



Novoflex 400mm, 640mm

To be imported soon to the U.S. by Burleigh Brooks, Inc., the double-convertible 400mm-640mm Novoflex telephoto lens "nests" compactly for handling between assignments. The 3-lb. unit is a 400mm f/5.6 job until an additional element is threaded into place, making it a 640mm, f/9 lens. A double row of diaphragm markings engraved on the barrel identifies relative aperture for each of the two focal lengths. Adapters for virtually all single lens reflex cameras are expected. Price: In the $300 to $400 range.



Visoflex II Bellows

Salient feature of Leitz's new Visoflex II Bellows Focusing Device is a built-in micrometer focusing stage that permits moving camera and lens assembly as a unit in order to focus without changing image size or field. The unit is redesigned to be more compact and lighter than the previous focusing device and provides such other niceties as a direct reading magnification scale for 90mm lenses, a rigid square travel bar with three steel insert-tracks, and means to switch from horizontal to vertical format.

Leicina 8S 8mm Movie Camera

Everyone expected a surprise from the people in Wetzler but not quite this 8mm movie camera with through-the-lens focusing and viewing. There is only one speed, 16 fps. The camera is operated by electric drive using four penlight cells or rechargeable nickel cadmium cells. The electric eye is powered by a small hearing-aid battery. Lens is 15 mm f/2 Dygon fixed focus with a 9mm focusing wide-angle converter and 25mm focusing converter available. A 6.25mm fixed-focus converter will also be available. Has battery tester.

Leicina 8V 8mm Movie Camera

One half of the Leitz surprise package at the show, this model has a built-in, permanently-mounted f/1.8 Schneider Variogon zoom lens with focal lengths from 8mm to 48mm, plus three speeds, 16, 24, 32 fps. Two concentric wheels control its operation, the outer wheel for zooming while the inner wheel focuses. As a result, you can focus while zooming. Varigon viewfinder prism is in front of the diaphragm, thus providing a bright image, regardless of the lens opening. Closest focusing distance of the Varigon is 40 in. This camera will not be available until the middle of 1961.

This was one surprise which really was, since everyone expected a still camera. It will be interesting to see how well Leitz does competing in a brand new (for them) field.

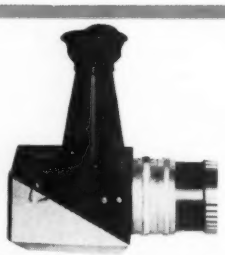
PHOTORESISTOR—THE NEW APPROACH TO LIGHT

Technology Puts Another New Word in the Photographer's Vocabulary

If the 1960 Photokina is any indication, photographers will have to add a new technical term to their jargon: "photoresistor." Applied in four new pieces of equipment, photoresistors were the talk of the show. Three exposure meters—the Gossen Lunasix, the Kilfitt, and the Asahi Spot—plus the Asahi Spot-matic camera use this ultra-sensitive, highly accurate means of measuring light. Photoresistors differ fundamentally from the photovoltaic cells long used in light meters. The familiar light-meter cell is activated by light to produce electric current which drives the meter needle. The new photoresistors, on the other hand, do not produce a current. They control a current provided by a tiny battery. In a sense, they operate as a light-activated valve. The more light falling on them, the more current they allow to pass. Since the voltage applied across the photoresistor can be stepped up when the light level is low, this system has it all over the conventional cell for sensitivity. In the Gossen Lunasix, this advantage is used to produce the most sensitive meter ever in the hands of the photographic public. The Kilfitt, the Asahi Spot and the Asahi Spot-matic camera, all score points by taking in an extremely narrow angle of acceptance. It's around 3°. The size of the active area of a photoresistor useful for photographic purposes is in the neighborhood of a ⅛-in. square. The photoresistors used in all four units are cadmium sulfide crystals, according to the information PMI has received. Actually they have been around for 20 years, but the problem of using them in a system inexpensive enough, yet good enough for photographic purposes is no small one. One of the keys to success is a tiny mercury battery used in all the units but not necessarily the sole source of power. The mercury battery has a long shelf life (some are permanently soldered into radios to furnish tiny bias currents, and are expected to last the life of the radio). It is quite suitable for furnishing the amount of current needed for a photoresistor. What's more, the mercury battery is amazingly stable in its voltage throughout its life. And when it does give out finally, the voltage drops off sharply. There's no question when replacement is needed. Meanwhile, back in Massachusetts, Dr. Land was showing the Polaroid Camera with its photoresistor-activated automatic exposure mechanism.

Lunasix Exposure Meter

This meter may possibly be the most sensitive hand-held meter ever made. Using a photoelectric resistor cell powered by a hearing-aid battery, it can read a light level as low as .014 fc (about as bright as moonlight on a landscape) with a 30-32° acceptance angle. Exposure calibrations range from 1/1000 sec. to 8 hours, with apertures from f/1 to f/90. ASA exposure indexes run from 6 to 12,000. There are two sensitivity scales, for normal and low light, plus a sliding incident light attachment to convert from a reflected to an incident light meter.



Asahi Spot Exposure Meter

Resembling a small waist-level reflex camera, this new departure in exposure meter design is a mercury battery-powered cadmium sulphide cell which can take a reflected light reading from an acceptance angle of 3°. Two sensitivity ranges are provided for normal and low light intensities. For readings on small objects or from great distances, the subject can be read from a ground glass with a central sensitive spot. The reflex mirror has a special coating to act as a compensating filter for accurate readings with color films.

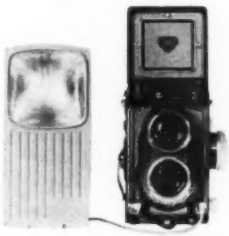
Kilfitt Exposure Meter

This meter is unique in that it fits into the filter slot of Kilfitt lenses. To use the meter, the photographer simply inserts it into his lens, focuses his camera on his subject and reads the meter directly in f-stops. Therefore the meter should give the appropriate reading of the field covered by the lens, regardless of its transmission of magnification. The meter makes use of the new cadmium sulfide, mercury-battery-powered photo-resistor. It is estimated that the meter will be available in the U. S. in January 1961.

SMALLER AND SMALLER THE FLASH UNITS GROW

Kobold AG1

This very compact and completely enclosed AG1 flash unit is designed to sell for about $1.85 in Germany. Its dimensions are 38 x 40 x 40mm (approximately a 1⅝-in. cube). According to the manufacturer, Fritz Consten of Munich, Germany, it will be equipped with an accessory manually-operated clip loading device. No American distributor has been chosen, and no American delivery date is estimated. Consten's address is Halbreiter Str asse 6.

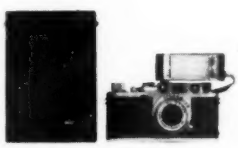


Multiblitz 20

Now available in the United States through Intercontinental Marketing, the Multiblitz 20 is a one-piece electronic flash unit measuring 6½ x 3⅛ x 1⅝ in. It uses a nickel cadmium battery, and runs about 86 to 96 flashes per charge. AC operation is also possible. Flash time is 1/600 sec. Kodachrome guide number is 30. Color temperature 5600K. Reflector casts a 60° beam.

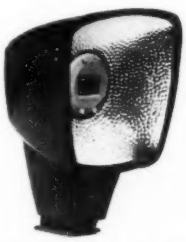
Coronet R

The Coronet R is a 135WS electronic flash AC or nickel cad unit that weighs 4½ lbs., and is 5⅜ x 7½ x 2¾ in. Recycling time to full power is approximately 6 sec., while recycling to half low power (40WS) is about 2 sec. Reflector is adjustable to 50 or 80°. The Kodachrome guide number is about 28 to 32 (full power). On one charging, the unit will deliver about 110 flashes at full power, or about 330 at the reduced output. Charging unit is built in. An accessory second flash is available with a 13-ft. extension cord. An accessory photoelectric cell is said to enable the photographer to set off the unit from distances up to 65 ft. An aperture calculator is built into the back of the flash head. Allied Impex is to be the importer. No delivery date is given.



Braun Hobby F 30

The Braun Hobby F30 is similar in performance and light output to the nickel cadmium F60, but is designed for those who prefer dry cell operation to recharging operation. It uses four C size dry cells, with which it gives 120 flashes. Flash duration is 1/1000 sec. Recycling time is about 10 sec. The reflector is designed to throw a wide-angle beam.



Ticky AG1 Flash Gun

Designed to sell in Germany for about $3, the Wilhelm Schmidt Ticky flash unit is notable for the ease with which it fits on most miniature camera shoes without disturbing the operation of the camera. Apparently, no American distribution is contemplated at the present time. The unit uses a 15V battery and a capacitor. It has an efficient pebbled reflector.

Broncolor Flash Unit

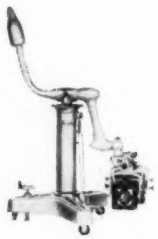
The Broncolor electronic flash unit is a 10,000WS outfit designed to operate two flashtubes. The modeling lights are rated at 800 watts, and they cut to half power when the flash circuit is cut to half power. The outfit is equipped with push button controls and a remote control panel is available so several units can be operated from one bank. Recycle time is 7 sec. The capacitors are guaranteed for five years. Bron Electronics Ltd. of Basel, Switzerland, is the manufacturer.

ONWARD AND UPWARD WITH CAMERA STANDS

Darkroom: Ingenious Use of Ingenious Plastics

Walking through acres of darkroom equipment, an American is struck by the ingenuity of European manufacturers in building sinks, tanks and processors of plastics. Stainless steel is expensive in Europe, and it does not apparently receive the worship there that it does in the U.S. The Europeans, particularly the Germans, make and sell everything from water jackets to film conveyors of seemingly specialized and well-suited plastic materials. Perhaps American manufacturers are wary of plastic's reputation as a substitute—but no counterpart of the very good and relatively inexpensive European darkroom equipment is to be seen west of the Atlantic. For example, by using sheet plastics on plywood forms, sink manufacturers are able to offer built-in compartments, baffles, drains, dump arrangements —and, further, offer the design in variaitons to fit many formats.

One refinement seen in many units is the sink with a translucent bottom, often dyed with a safelight color, and sold with transparent plastic trays for inspection of sheet film during development. Many of the sinks are equipped with water hoses with built-in brushes for clean-up. Clever plastic drying devices position film reels (also plastic) at the neck of sort of an hour glass configuration to get maximum transfer of water from film to air. Circular washers, many with moving parts, made entirely with plastics were shown with low price tags. High grade moldings of plastic are used for gears, chains, magnifier frames and other parts that in the U.S. would be expensive machined castings.

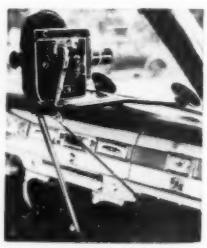


Gigant Studio Stand

The new Linhof Gigant Studio Stand positions even the heaviest of still cameras any place from floor height to 9 ft., in a full 360° arc. (Minimum distance from the floor to the optical axis of an 8 x 10 Kardan color camera is 8 in.) A similar 360° horizontal movement is provided. What's more, the camera position can be regulated by remote control—two push buttons connected to the stand can control the entire unit. It is said to lock firmly in any position chosen.

Combo Ladder Stand

Manufactured in Holland and to be imported by Burleigh Brooks, Inc., the Combo Ladder Camera Stand is designed to get the photographer off the ground—from 3 to 10 ft. off the ground. It's a lightweight adjustable metal tripod ladder. Altogether there are three sections. With one section the camera can be 3 ft. to 4 ft. 8 in. high; with two sections 5 ft. 6 in. to 7 ft.; and with three, 8 ft. 2 in. to 10 ft. The feet are also adjustable to level unit on uneven ground.



Viegel Car Tripod

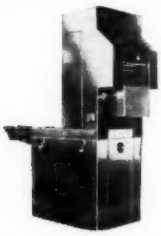
Intended mainly for making motion pictures of the outside from inside an automobile. The Veigel Auto-Stativ comprises a camera platform, two suction cups for application to the windshield, a telescopic leg and an elastic band with a hook for securing the unit to the bottom of the car. The unit is said to fit against not only the windshield, but also a side or rear window. A slot for the tripod thread fitting enables the user to position his camera close to the glass to suppress reflection problems.

Viegel Hoch-stativ

The Viegel Hoch-Stativ is a three section ladder and camera stand made of metal which collapses to about 4½ ft. and extends to about 14 ft. The weight of the unit is about 66 lbs. No plans have yet been established for distribution of the unit in the U. S.

Camera supports of this type can be very useful to the in-plant man who must get pictures of an area from a high viewpoint. Generally, the choice in these cases is the top of a car at about 6 feet or a plane at least 600 feet. A ladder is generally quite shaky and provides too little working area. These stands could be the happy medium philosophers and photographers always search for.

UNIVERSAL PROCESSOR, ROLL PROCESSING, COLOR



Autotrac Processal

The Oscar Fisher Autotrac Processal is said to handle any type of roll or sheet film or paper (black-and-white) from 16mm wide to 12 in. wide, completely automatically. There is no leader, and once the photographic material is loaded the operator need not attend the unit. Characterized as a "spray immersion" processor, the unit is said to have operating speeds of 50 ft. per min. for motion picture film and 10 ft. per min. for roll and sheet film and paper. The complete dry to dry cycle is as short as 7 min. Price: below $6,000.

Hansen Processing Unit

To be distributed in the U. S. by the Pako Corp., the new 16mm Hansen processing unit is made by the N. V. Optische Industrie "Old Delft", of Delft, Holland. Up to 100 ft. of film is loaded up on reels for tanks processing with a motor driven loading device, which also handles up to 100 ft. of 35mm, 45mm, 60mm or 70mm film with the appropriate reels. Allied equipment includes cylindrical processing tanks, compact forced air dryer.

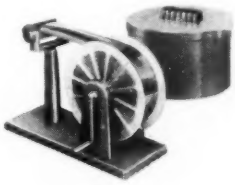
Kinderman Processor

A new Kinderman processor, to be imported to the U. S. by Walter Voss, N. Y. C., develops, fixes, washes and dries 500 ft. of 90mm paper (3½ in.) in about 14 min. The unit stands 4 ft. high, 6 ft. wide and 2½ ft. deep. It is expected to be available in the U. S. in the Spring of 1961.

The Kinderman line also includes a very useful series of stainless steel roll film tanks, reels and easy-loading devices for the reels. This equipment is one of the very few lines in Europe which uses stainless steel instead of plastic materials.

Roll Paper Processor

The Jobo processing unit is intended for small-volume processing of roll paper from 76 to 89mm in width and up to about 30 ft. in length. It consists of a roll paper loading reel, a sink with temperature control and five processing tanks. Additional reels may be used to increase production. Johannes Buckemuhl is the manufacturer, Studiophot is the U. S. distributor. No estimate is made of the delivery to America. Price in Germany is about $420.



Jobo Film Tank

The Jobo 10 M Tank, manufactured by Johannes Bockemuhl of Cologne, Germany, is intended for processing up to 10 meters (about 33 ft.) of 35 or 70mm film. The system includes processing reels, a hand driven reel loader, and a light-tight developing tank. A single reel of 35mm requires 2 liters of solution, two reels take 4 liters. One roll of 70mm is processed in 3 liters of solution. The unit sold in Germany is about $100.

Color Photography Increases

Reports from Photokina indicate that the growth of color photography in Europe is impressive with new films at lower prices now available. New films include Adox C18 Daylight Type Reversal, with an E.I. of 50, and NC 17 Negative with an E.I. of 40. The former is available in 35mm only, the latter in 35mm and 120.

Agfa now has Agfacolor Reversal CK20 in 35mm and 120. This film is balanced for 3200° The exposure index is 80. Other Agfacolor films include CN14, CN17 and CT18, available in the U. S.

Kranz Color C18, rated at 50, is a Daylight Reversal film in 35mm only made by an old Munich firm. It is said to have high resolution and fine grain comparable but not equal to Kodachrome.

In addition to these films, there are complete lines of Kodak, Ansco, Perutz, Ferrania and Gevaert films.

LENSES FASTER, LONGER; ENLARGERS STRONGER

Lenses

Zoom lenses are big in the 8mm field with three new models. First is a Schneider Variogon f/1.8 lens with zoom from 8mm to 48mm, a 1:6 ratio unprecedented in zooming history. The Isco entry is an f/1.8 Varon, from 9mm to 30mm. Last is an f/1.8 Angenieux from 7.5 to 35mm. Paillard introduced two high-speed lenses, a 13mm f/0.9 Switar for 8mm and a 25mm f/0.95 Cinor for 16mm. Most interesting new lenses for still cameras were the Angenieux Zoom Type LB3, f/3 for the Alpa, with a range from 50mm to 200mm, and an Enna Tele-Zoom f/4 from 85mm to 240 mm.

In still field, a minor trend is development of f/1.4 lenses, including a 35mm Summilux for the Leica and a 58mm Zeiss Planar for the Contarex. Speed honors go to Canon for f/0.95 Canon VII lens.

500mm for Contarex

In order to achieve an effective aperture of f/4.5 and yet avoid unsharpness due to chromatic aberrations, Zeiss has reverted to a Cassegrainian telescope type lens design in the Zeiss Mirror Objective 500mm lens for the Contarex. By using spherical mirrors as the primary means of bending light through the light, the lens is able to focus the entire spectrum including infrared on the same focal plane. Correction lenses (transparent glass) straighten out minor deviations from perfection, it is implied. This means giving up the diaphragm, the lens has none, but Zeiss feels the image quality at f/4.5 makes this a small sacrifice. Just in case things are too bright, Zeiss has included a slot in the baby telescope for neutral density filters.

Tele-Tessar 500mm

The new Tele-Tessar's claim to fame is that it is the first 500mm lens on the market with an automatic diaphragm. The lens, which incorporates a Synchro-Compur shutter, couples with the Hasselblad 500C camera. Maximum aperture is f/8; the lens shuts down to f/64. On the Hasselblad, the lens focuses down to 28 ft. from the film plane, giving a reduction ratio at this point of 1:14. The length of the lens from front element to the film plane (focused at infinity) is given as 380mm (15 in.) and the weight 1.9 kg (about 4½ lbs.). The lens consists of 5 elements combined in an optical group of three lenses in front and a two-lens dispersing group placed behind the diaphragm. The lens is equipped with a tripod fitting.

Foba Camera Stand

Two models of the Schmid & Co. (Aarau, Switzerland) camera stand were shown at Photokina 1960, but no plans were announced for importing the units to the United States. The smaller of the two, Model 1, stands weighs in at about 300 lbs., will handle a camera from about 1 ft. from the floor to about 6½ ft. Extension from the center post of the stand is about 5 ft. The stand is mounted on three rollers, whose movement is locked and unlocked by means of a foot pedal. The larger unit, Model 2, hoists the camera from floor level to about 7½ ft.

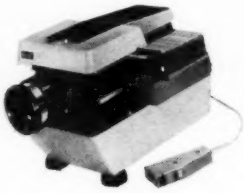
Komet 300SG

Made by Meteor Apparatebau, Paul Schmeck, Siegen, Germany—the Komet 300SG is a photomechanical enlarger, with a high pressure xenon arc light source with complete intensity control. It is equipped for use with a magenta screen or with conventional ruled screen at the easel, which has a disc for screen angling to prevent moire in color reproduction. A lamphouse filter drawer accepts four 30 cm filters. The enlarger head accepts 13 x 18 cm negatives, and the easel 50 x 60 cm material. The lamphouse tilts 90° for horizontal projection.

Durst Laborator

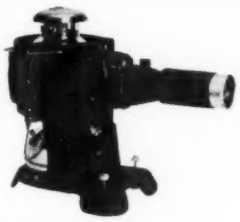
A refinement of the Laborator, the 184 is novel in that a double condenser is offered to cover a full 8 x 10 negative or transparency. The enlarger head is carried by a double column and its height is adjusted by means of a hand wheel. The vacuum easel is screened from the chromed columns with a "coupled bellows type blind." The unit is supplied with an interchangeable panel for a 360mm lens (which permits a magnification of 2.5 to 1 or a 1:1 reproduction). A lens turret for lenses of three different focal lengths is available as an accessory.

2¼ AUTOMATIC PROJECTOR; ESOTERIC EQUIPMENT



Rollei Automatic Universal

This title belongs not to a camera but to a slide projector which takes both 2 x 2 and 2¼ x 2¼ slides. The smaller size feeds from the right, the larger from the left. Both sizes can be projected separately or in mixed sequence. All functions, forward and backward changing, repeating slides, focusing, are controlled by press-button or 10-ft. cable. Unit uses 300 or 500-watt lamp. Lenses include 110, 150 or 250 Heidosmat lenses. Tape recorder coupler and carrying case available. Projector holds 30 2¼-in. slides, 30 or 50 2 x 2-in. slides.

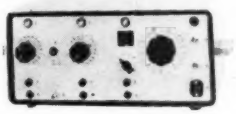


Turklilux Projector

The Turklilux is one of those items —there are literally thousands—an American could expect to find only at a Photokina. It's a 35mm slide and filmstrip projector that uses a kerosene lamp with a gas mantle for its light source. It's a bit heavy (35 lbs.) but it is complete with convection cooling, interchangeable bayonet-mount lenses, rotating projection head and a very bright optical system. The manufacturer, Optimar of Salzburg, Germany, has not made plans for American distribution.

Linhof Cine Gyro Head

A new accessory for the Linhof tripod line is a Cine Gyro Head shown here between a Light-Weight Pro Tripod and the Linhof Professional Pan Head. The Gyro unit weighs 3 lbs., 5 oz. The gyrating speed is adjustable to the weight of the camera. The length of time for a full panoramic turn reaches from 7 to 20 sec. No U.S. delivery date or price was available at Photokina.



Intervalometer

Produced by the famed optical instrument maker, Wild Optical of Heerburg, Switzerland, the Wild Time Lapse Intervalometer offers a wide choice of timing pulses through three outlets. For example, the main pulse may be at 1 sec. intervals, while the two side pulses are at, say, .9 and 4.5 sec. respectively. Accessories are a single-exposure motor for the Bolex H-16 camera and an electromagnetic shutter. 220V 50 or 60C current. German price for the Intervalometer, about $2000.

Reproduction Camera

The Standard Automatic photocopying machine is an autofocus reproduction camera with an automatic developing device. An unusual feature is the fact that the unit may be used as a vertical camera or, for reductions of larger copy, as a horizontal camera. The film or paper magazine has a capacity of approximately 300 ft. Processing is said to be completely automatic and negatives can be produced in as short a time as 20 sec. Curtis Young Corp. is the American distributor. According to the manufacturer, Fotokpoist Muller KG, the unit will be available in the U. S. in the spring of 1961. The price in Germany is approximately $4,500.

Shutter Tester

The Chronotest electronic shutter tester, a unit about 8 x 8 x 16 in. is unusual in the range of intervals it will test. It is said to evaluate times of one sec. to 1/10,000 sec. to within plus or minus 2 per cent. The unit operates on 220V AC (50C), uses a 2W bulb for shutter testing purposes, and has a built-in photocell. A milliammeter is provided for the control of the photocell current. Three keys are used for setting operating range. Test results are indicated on a percentage scale. The manufacturer is Dr. Justus Rosenhagen of Hamburg, Germany. No American distributor has been chosen, and no estimate of availability or price in the U. S. was made.

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ARKANSAS FUEL

(*continued from page* 30)

Another unusual feature of the darkroom at Arkansas Fuel are the waist-high waste baskets. Instead of resting on the floor, they are suspended from the wall. The theory is that if the waste basket is within easy reach, there is no need to play waste-basketball with the resultant clutter of near-misses on the floor.

Everything in the darkroom is on casters, for easy cleaning and to adjust the darkroom arrangement to fit specific needs, or for more convenient working arrangement. It is a lab tailored for people.

The big and the small

Print production ranges from contact prints to 5-ft. murals. The contact printer is equipped with interchangeable glass plates with ¼-in. lithographer's red tape for borders. There are glasses for 12 No. 120 negatives, four 3¼ x 4 and four 4 x 5. Prints are made on one sheet of paper, then cut apart. Little contact printing is done, mostly proof sheets and an occasional large run from an 8 x 10 negative.

Englargements are made on a Simmon Omega enlarger and an 8 x 10 Elwood, equipped with a varilight unit. The Elwood is used for proofing with red printing-out-paper (POP). The reason for using this paper is that people who order prints will request permanent prints almost immediately, before the proofs darken.

Ektalure and Polycontrast Rapid papers are used for most prints, the latter with the Omega Variable Contrast Timer. When a package of paper is opened, all the corners are rounded to prevent prints from being scratched by sharp corners.

Enlarger lamp burning bright

Rheostats are used to vary the light intensity of the enlargers. The printer can work with the lens nearly wide open, yet increase exposure time if necessary to permit dodging or flashing. Flashing is done with several small flashlights whose faces are covered with cardboard in which a ¼-in. hole is punched. The hole is covered with a diffusing material such as clear matte film.

Embroidery hoops with various thicknesses of black chiffon stretched between them are used for diffusing prints. The amount of diffusion varies with the number of layers of chiffon in the hoop. The greater the number of layers, the more diffusion.

Prints are processed in trays on a tilting table which provides gentle,

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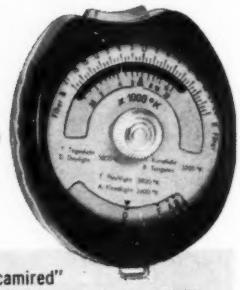

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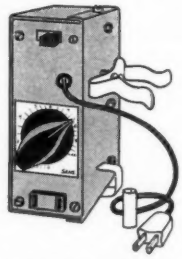

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constant agitation. A special no-slosh tray is used for hypo: made of Lucite, it has Lucite cylinders at each end of the tray to act as baffles, braking the rocking of the tray and preventing splashing. The rocking assembly is motor-driven, very much like that used in Dye Transfer work.

Prints are dried on ferrotype tins, stored back-to-back so that the tins remain scratch free.

A precise trimmer

As an aid in print trimming, a fluorescent tube is placed in a hole underneath and parallel to the trimming edge. There is a wooden handle near the trimmer which opens a trap door. This trap door covers a fluorescent tube and a chute down which paper scraps will go. This tube illuminates the overhang of the paper to show the exact position the trimmer blade will hit.

To avoid trouble from freshly stamped prints—the ink from the back of one coming off on the face of the print below—Hampson uses a quick dry rubber stamp system. It uses an end grain hardwood instead of a pad to carry the ink. Made by the Phillips Process Company, Rochester, N.Y., this unit not only eliminates offsetting but allows a print to be stamped before being developed.

One of the specialties of the photo department at Arkansas Fuel Oil is the production of murals for offices, reception rooms, etc. Some of the larger murals on display are gold and selenium toned.

Walls as easels

The white walls of the darkroom are used as an easel in mural making. The enlarger is wheeled into position and a front surface mirror used to project the image on the wall. When proper focus and composition are secured, a grease pencil is used to mark the proper paper position on the wall. All lights are then turned off (except, of course, the safelight) and paper, Kodabromide N-2, mounted with Scotch tape. Contrast control is achieved by varying the developer. Monk's cloth frames stretched on the floor of the darkroom are used for drying the mural.

Prints 30 x 40 or 40 x 60 are first mounted on masonite. Murals over 5 ft. are mounted directly on the wall. The wall is first sized with shellac, then unbleached muslin is pasted over the shellac using wheat paste cement. The wet print is mounted on the muslin with the wheat paste cement. An allowance

(*continued on page 57*)

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ARKANSAS FUEL

(*continued from page 55*)

of ¾ in. per foot of length is made for stretching of the paper during processing. As the print dries, it contracts and fits perfectly.

The department also makes display prints which are mounted in specially-designed hardwood moldings. The molding permits changing the 16 x 20 and the 20 x 24 prints from time to time.

A new copying set-up is in the process of installation. The copy camera will be supported by an overhead track, square with the wall. When not in use, the camera can be pushed out of the way. An unusual feature is the copy board, a 16 x 20 x 2½ box to which is attached a home-type cylinder vacuum cleaner. This provides sufficient vacuum to hold the copy material. Only continuous-tone material is copied by the photo section. A separate Graphic Arts department makes line copies.

Two cameras for one

Another interesting arrangement is the use of two cameras, an Argus mounted on a view camera, for portraits. The department makes all publicity-type portraits for announcements of promotions, honors, etc. By using a 35mm camera at the same time, the section provides ID photos without extra effort or an extra sitting. According to Hampson, the section does about three to five hundred head and shoulders pictures annually.

Unlike most photo departments, this one does not use a drum dryer for prints. Instead, it uses 18 x 24 ferrotype tins placed in a Professional Print Dryer. Both matte and glossy prints are dried this way. There are two advantages in this method. The first is that a man is not needed to feed the drver: it can be loaded with 250 8 x 10 prints in 20 minutes, then left to a time clock. The second is that with the lower temperature used (95°F), prints come out much more flexible than from a drum dryer.

It is unusual to find as much evidence of individual planning and adaptation as is present in the photo lab of Arkansas Fuel Oil Corp. There is nothing gaudy. Everything is designed to meet the needs of this particular section as efficiently as possible. There have been other sections as small, as neat and as well organized, but few sections, large or small, can boast of the custom touches which makes Arkansas Fuel so unique among in-plant photo departments.—THE END

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Ernest E. Reshovsky

PHOTO INSTRUMENTATION

Ramo-Wooldrige slices its color processing time to five minutes

The problem was to produce a finished color transparency at the fastest speed possible and retain contrast for line work reproduction and color accuracy.

Charles C. Stanley, photographic technician at Ramo-Wooldrige Corp. in Canoga Park, Calif., attacked the problem when he joined the corporation in September 1959.

Now the Ramo-Wooldrige Display Generation Method is capable of routine dry-to-dry processing of Ektachrome E-2 emulsions in 11 min., a time which can be reduced to as short as 5 min.

The project involves color negatives prepared in advance of display showing statistical data such as maps or charts. Important fresh data is super-imposed on these negative masters. The problem was to make a transparent print combining the negative and the new data; this to be shown in as fast a time as possible to an audience in the form of a color positive transparency.

First experiments

The first experiments were conducted using color negative material (Kodacolor and Ektacolor) with the positive prints made on Ektacolor print film. This system worked reasonably well, but took too long in the processing stage, since the developing process could not be accelerated.

It was then decided to use Ektacolor E-2 as a print film and contact prints were made on this material. Filtration required was very heavy (80Y and 20R) but acceptable results were produced processing the E-2 print film at 90°F (± 1/10°F) in B-41 developers for 14-15 min. over-all.

At this point the research program results were fully evaluated and it was decided that the chemicals used were too powerful at the accelerated temperature with resulting lack of contrast and color saturation in the final print.

As Stanley put it: "We shopped around and finally found an E.K. Co. formula for machine processing of movie Eastman color film that seemed to fit our requirements. This was formula S.D. 30." At the same time it was also decided to replace the color negative material with Ektachrome film processed to a negative, thereby dispensing with the heavy filtration necessitated by the built-in orange mask which is found in such material as Kodacolor and Ektacolor.

Improved results

Using the S.D. 30 formula in modified form yielded greatly improved results. The modification was mainly in substitution of rapid liquid fix for the F.5. fixing bath. Again the films were given 90°F accelerated development with constant vigorous agitation and the processing time was found to be 8-10 min. over-all.

To make the contact prints a T8, 100W, 20V light source was used, which emitted 3100K. With the clear (non-masked) Ektachrome film developed to a negative, only minimum filtration was required—in fact, just enough to raise the 3100K lamp temperature to the film's 3200K design temperature. Filtration consisted of a light balancing filter No. 82 and a 2B (UV absorber).

Results of this method of processing were found to be excellent. Minimum density is 0.3 to 0.4, with a maximum density of 1.6-1.8. Resolution under near perfect conditions is 45 l/mm and the keeping qualities of the speed-developed transparencies is excellent. This in spite of the fact that it was found that high-speed rinses by force flushing of the film can be as short as 30 sec. during the various stages of processing with a final force flushed wash of only 1½ min.

The film is dried by a process of air knifing and hot air treatment in about 1 min. and the over-all dry-to-dry processing time is 11 min. To further reduce this time, the bleach and fixing solutions have been com-

(*continued on page 60*)

24 EYES ON THE BALL

The simultaneous recording of data from 24 points on a missile model in a shock tube wind tunnel is now possible with a multi-channel camera developed at the Naval Ordnance Laboratory, Silver Spring, Md. The new camera records temperature and pressure information in microseconds from oscilloscopes connected to probes on the model while it is being tested in the Laboratory's hypersonic shock tunnel.

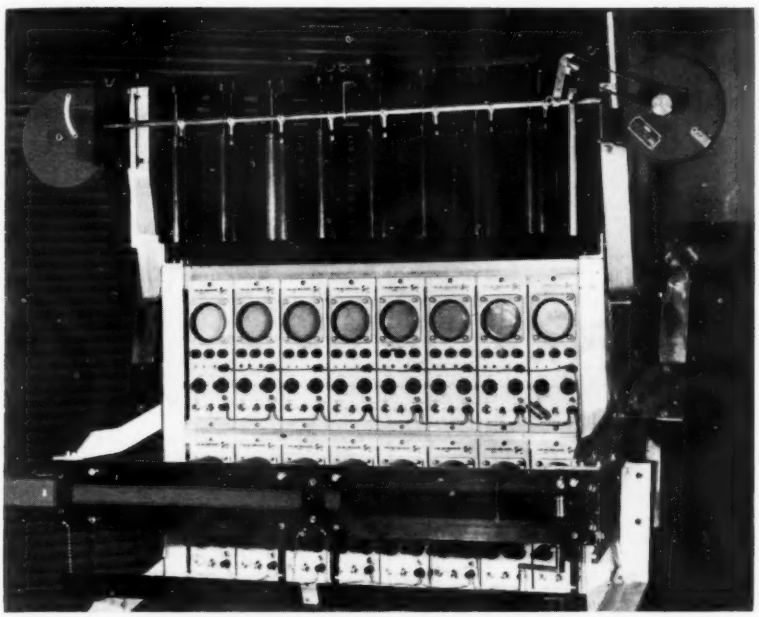
The unique photographic recording device was designed and built by technologists and engineers of NOL's Photographic Division, Engineering Services Department, to meet specifications provided by the Gas Dynamics Division, Ballistics Department.

With the new 24-channel oscillograph camera, test data is permanently recorded for study as it is received from the transducers, or probes, mounted at various points on the missile model. A time-varying voltage transmitted from a probe is very briefly displayed on the oscilloscope face.

Study of the oscillograph records helps to determine the air pressures exerted on various parts of the missile, and also enables the scientist to measure the heating of various portions of the missile. Simultaneous measurements at all test points are necessary to save manhours and money, and to insure that all data points are tested under identical conditions.

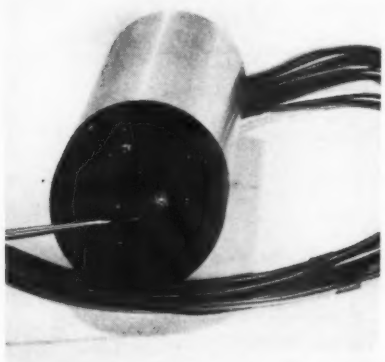
The Laboratory's Ballistics Department specified the conditions under which the camera system must operate. Photographic engineers and technologists compared these requirements to the specifications of commercially-available equipment, and concluded that the design and

(*continued on page 75*)



New 24-channel camera, showing two of its three rows of eight lens-and-shutter units and oscilloscopes. Top unit is raised; second is locked into position.

In microseconds, camera records heat and pressure from oscilloscopes connected to probes on a missile during shock-tube wind tunnel tests.



Missile model, showing probes and wires leading to oscilloscope.

SHARP EYE ON TOMORROW...

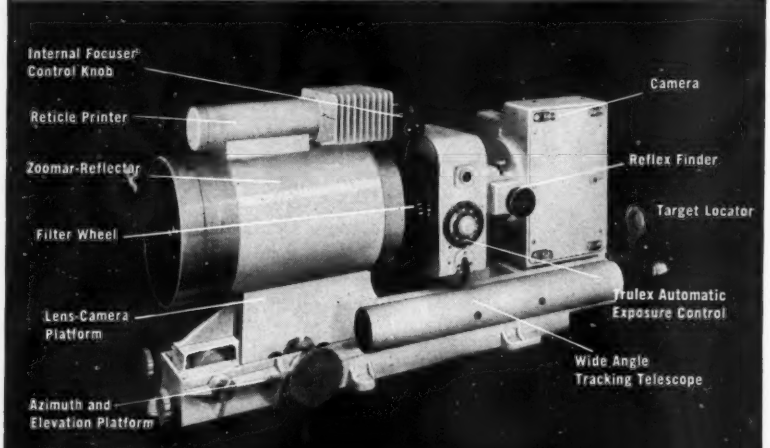


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PHOTO INSTRUMENTATION

(*continued from page* 58)

bined. At a sacrifice in quality this gives an over-all dry-to-dry processing cycle of 5-6 min.

The Ramo-Wooldridge Display Generation Method displays data in full color to large audiences, as soon as possible after the event, and uses a slide size of 70mm x 100mm in specially designed projectors.

Film distortion detection

Eastman Kodak Co. announced a new method for detection of aerial film distortion as small as 1/5,000 in. The technique is based on an effect known as the moire pattern. The effect can sometimes be seen as a network of wavy lines on screened windows when light, passing through the window screen, is reflected from the glass back through the screen in the opposite direction. The interference of the real image with the reflected image causes the moire pattern to show as wavy lines.

To locate tiny film distortions by the use of moire patterns a halftone tint on the aerial negative is studied. From the aerial negative with its superimposed halftone tint a print on glass is made and registered with a master halftone that was printed on the original negative. The location and size of distortions become visible as irregularities in the moire pattern formed by the two halftones. The size and extent of the distortion can then be calculated with photographic measuring devices and computers.

Causes for distortion may be water spots left on the film after processing, excessive processing machinery tension or abnormal heat.—THE END

WHAT?

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PHOTO INSTRUMENTATION AT WISCONSIN U

This two-day session provided highly concentrated food for thought, covering all phases of instrumentation from making the film to taking pictures in a person's stomach

The forty men who gathered at University of Wisconsin last month for a two-day Institute in Photographic Instrumentation came away with many a new idea and renewed enthusiasm generated by many a specific example of unique photo techniques.

The University's Cass Hurc kept the program on a strict schedule that had Beckman & Whitely's genial Bob Shoberg (who chairmanned the meetings) hard put to terminate discussions. Even the opening speaker, Wilton R. Holm of the Photo Products Division of du Pont had difficulty in getting away for the luncheon break because of spirited questioning. He defined photographic instrumentation as the use of photographic medium to detect, record and measure scientific and engineering phenomena. He listed typical examples: freezing motion, sequence recording, time magnification, time minification, fluid flow recording, missile tracking, photo surveillance, aircraft photo instrumentation, ballistics techniques, human engineering studies, photographic measurements.

He gave a most lucid, yet thoroughly academic, report on film characteristics. He defined sensitometry as the science that predicts what a film will do and showed just how sensitometric curves were arrived at. Special aside: During the discussion William Swann of Eastman Kodak's Special Sensitized Products Division mentioned that most of the new very high-speed films would benefit little or not at all from pre or post fogging or other means of hypersensitization. As Holm pointed out that it takes a minimum of four photons (light energy units) to activate a silver grain to a developable stage, but that most of the new fast films have, in effect, some built-in photons, which are released or made available when the film is struck by light. Thus very weak light with even a few photons per unit area can still produce a developable image.

The "definition" of a film image depends on tone reproduction, sharpness of projected image, graininess, and resolution, and that the spaces between the grains are important too . . . That soon we will hear about the "sine wave response" of films in regard to their definition. Others might refer to it as discussing the point spread function of the film . . . If a dotted line were drawn and photographed, a cross-section of the film in a plane through this line should show a "square wave." Actually because of scattering of light, bleeding of the image, and photochemical problems in development, we get a sort of sine wave. The nature of the sine wave tells something of the definition of the film. Another new term that may be heard soon will concern the relative efficiency of the film in achieving its purpose: to secure projected images by the absorption *and* transmission of light, and will be referred to as the film's "power-noise spectrum."

During a discussion on exposure meters that came up during the question period, he drew a round of laughter when he commented that "good scientists and engineers *always* doubt their instruments."

Eastman's William Swann discussed unusual Photo Products and practices and enumerated many more than can be outlined here. He, too, added to the basic thinking by describing photography as "a chemical method of amplification for storing and recording data. Only a few quanta or photons of light are required to produce a latent image, but the amplification by means of processing is of the order of a billion times."

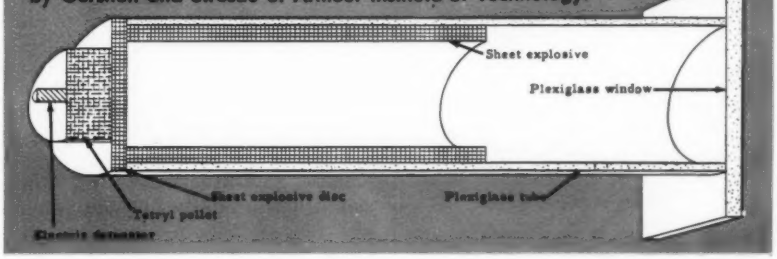
He told how nuclear particles were sometimes tracked by stacking up piles of film, and getting a trace in the stack by developing the sheets separately and then reassembling. This is a somewhat unhappy arrangement, so thick emulsions were tried, but the outside of the emulsion would be fogged before the center had started to develop. So the film was soaked with developer at a temperature at which no development took place. The temperature was then raised. Development took place uniformly throughout the emulsion. Then the development was halted by lowering the temperature again.

In "autoradiography" where radioactive materials were placed on films which were subsequently developed, it was often impossible to place the film back exactly over the sample, so sections of the material were made, the film emulsion coated on them directly and then developed in place. These emulsions are a standard item.

Most curious are balloons of Kodak Autoradiographic Elastic Base Film Type I of various shapes which are inserted in body cavities (such as the stomach) and inflated. The patient with suspected disease

(*continued on page* 62)

Explosive flashlight, 2½ in. in diameter, was developed by Gershon and Stresau of Armour Institute of Technology.



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HIGH SPEED AT WISCONSIN

(*continued from page 61*)

such as cancer is given a radioactive compound which is absorbed by the cancerous tissue only. This exposes the emulsion on the balloon which is then extracted and developed.

Linagraph Shellburst Pan was pointed out as a useful but little known film developed during the war to photograph anti-aircraft bursts against a blue or grey sky. It has moderately high speed, high contrast, and fine grain.

Fast color films lose speed and color balance when exposed for long periods, such as must be done in astronomical work. The U.S. Naval Observatory in Flagstaff, Ariz., discovered that such color films exposed at minus 70°C retained their color balance. (Reciprocity failure of all films disappears when exposed at extremely low temperatures.)

Linagraph Direct Print paper is a print out paper which is used in recording. The image is quite faint when first recorded, but is intensified by exposure to fluorescent light. Like red proofs, the print must be kept in the dark to preserve the image, but can be stored for many years.

To fine grain enthusiasts, Swann pointed out that the slowest of the photo emulsions has a grain diameter of .02 to .03 microns (.001 millimeters) which is good enough to record the entire Encylopaedia Britannica on a plate 4 inches square. Of course we have no optics good enough to do it.

Keith Williams of Tectronix Inc. went through a survey of the methods and problems of Oscilloscope Trace Recording. (Incidentally, Tectronix has several brochures which are worth writing for on this subject.)

Peak wavelenths, decay times, phosphor efficiencies, and writing rates, films and emulsions, spot size and spot intensity all are important in getting a useful record. Photographers who must do some recording for engineers should be sure they understand which part of the writing contains the useful information.

Williams distributed a list of oscilloscope camera manufacturers which enumerated the surprising number of twenty-nine. A new camera (by Tectronix) for 5-in. scopes has a number of new, novel and important features and is certainly worthy of investigation by those contemplating such a pur-

N E W !

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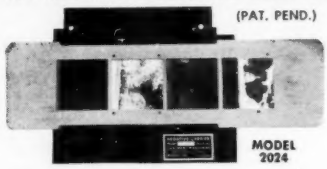

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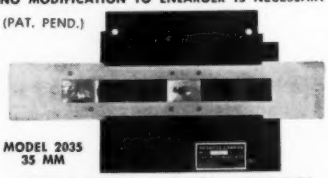

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Bald Eagle Corp. 60 East Fourth Street St. Paul 1, Minnesota

Get more information. Circle 406, page 67

chase. The use of Polaroid films is practically universal in all these cameras, though, of course, most are adaptable to other films also.

GE X-ray's John Bigelow ran some amazing X-ray movies showing everything from the action of the bowels, through the battle of an ant and a spider, to the amalgamation of mercury and aluminum. Photographers were impressed with the precise elaborate and expensive mounts used to contain and position the photo apparatus. Big discussions arose around a non-photographic problem—how much radiation is safe for photographers (or anyone) to be exposed to. Conclusion—the smaller the amount the better.

William Hyzer, Consulting Research Engineer and PMI columnist, prepared a paper on Photographic Data Reduction, an analysis of the philosophy and the mathematics of the photographic approach to the science of measurement. "It is important," he pointed out, "that in referring to the camera as an instrument of measurement, we are in fact concerned with the entire photographic system used to measure or to record an object or an event, including the instrumentation and techniques required to interpret the photographic record. The camera may comprise only a small part of the overall instrumentation complex."

Jack Gershon of the Armour Institute of Technology reviewed the methods of high-speed photography, discussed shutters, pulsed light sources, and showed a revealing animation from a Beckman & Whitely 189 High-Speed camera on the detonation of an ammonium nitrate fuel oil mixture.

The explosive flashlight, as Armour calls the explosive argon flash that Gershon and R. H. Stresau developed there, is a plastic tube about 2½ in. in diameter lined with a sheet of du Pont sheet explosive. One end has a transparent plastic window, the other a detonating material to start the reaction. The argon is introduced into the cylinder and allowed to flow through and out just before the flash is put to use.

Later Gershon set up a demonstration utilizing the new 1/3 micro-second flash unit of the firm of Edgerton Germeshausen and Grier, with its accompanying microphone pick-up and time delay calibrated from 0 to 100 microseconds. Everyone had an opportunity to try to

(*continued on page 75*)

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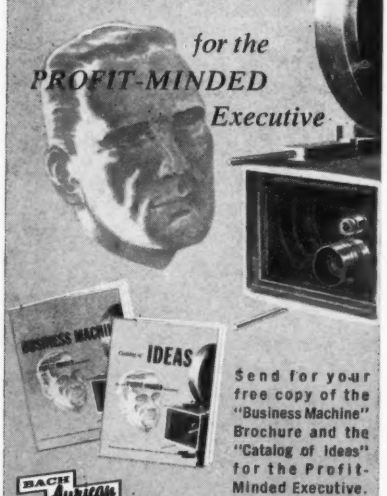

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FREE LITERATURE

For your copy of any free literature item, circle the appropriate number on the readers' service card, attached, page 67.

AUDIO-VISUAL

REPRINT ON FLIP-TOP 201
DuKane Corp. Reprint from *Salesweek*, "Projector Puts Sales in Green Pastures," tells story of DuKane's Flip-Top portable sound and filmstrip projector as utilized by International Harvester.

STOP-MOTION PROJECTOR 202
Birns & Sawyer. 4-page illustrated folder describes the Model 2000 Stop-Motion 35mm projector. Includes prices and accessories.

SLIDE TRAYS 203
Yankee Photo Products. Illustrated specification sheet gives complete information on the deluxe slide trays and carrying cases made by Yankee.

SYNC SIGHT AND SOUND 204
Synchro-Mat Equipment Corp. 6-page illustrated folder describes the Synchromat which synchronizes tape recorded sound with slide or filmstrip sight. Includes specifications.

TELEXECUTIVE 205
Telit Industries, Inc. Illustrated folder gives details of the TelExecutive portable, electronic prompting device. Describes in detail method of operation.

OUTDOOR PROJECTION 206
Genarco, Inc. 8-page pamphlet describes the method of projecting giant images outdoors with the Genarco 3000-watt slide projectors. Includes some information on rear projection.

EQUIPMENT

SEE-SHARP 207
Cargille Scientific, Inc. 4-page illustrated leaflet describes the See-Sharp magnifier. Includes directions for use.

LENS STOP CALCULATOR 208
Natural Lighting Corp. Wallet-sized rapid calculator for determination of correct lens stop when using filters or shooting above or below normal speeds. Also included is a table for equation of incident tungsten light values, film speed ratings and lens apertures.

HANDLING 35MM EQUIPMENT 218
Eastman Kodak Co. 6-page pamphlet tells how to avoid errors in film loading, winding, rewinding and handling before it reaches the processor.

INTERCHRON TIMER 219
Bald Eagle Corp. Illustrated catalog sheet describes the Interchron timer Model 52. Includes description of method of operation.

NEW ASCOR CATALOGS 220
American Speedlight Corp. Two 8-page catalogs for the Series 400 and Series 600 line of Ascorlight electronic flash equipment. Includes technical specifications, power supplies and accessories.

MACBETH QUANTALOG 221
Macbeth Instrument Corp. 4-page illustrated brochure describes in detail the QuantaLog and lists accessories available for it.

MASTER IV EXPOSURE METER 222
Daystrom, Inc. 6-page illustrated folder gives information on the new Weston Master IV exposure meter. Lists major improvements.

COLORTRAN PACKAGE 223
ColorTran. 4-page illustrated reprint from *American Cinematographer* tells how photographic lighting of high efficiency is provided by lightweight equipment using small bulbs working on boosted voltage.

DATA RECORDING UNIT 224
PAR Products Corp. Specification sheet gives detailed information on the PAR Data Recording unit. Lists salient features and prices.

SLIDE CABINETS 225
Multiplex Display Fixture Co. 16-page illustrated catalog lists all-steel slide cabinets manufactured by this company. Includes complete specifications.

MICROSADIC/TIME PROGRAMMER 226
Consolidated Electrodynamics Corp. Illustrated bulletin describes the MicroSADIC/Time Programmer. Includes complete specifications and a block diagram.

STROBONARS 227
Heiland Photo Products. Illustrated brochure gives specifications for Heiland Strobonars for the professional. Also lists prices and accessories.

STEEL FURNITURE 228
Smith System Mfg. Co. 8-page catalog lists specialty steel furniture and equipment including TV carriers, projection carts and filmstrip cabinets. Includes prices.

CONTACT PRINTER 229
Siok Universal Photo Printer. Inc. 6-page illustrated folder describes the Siok Universal printer. Includes detailed description of all features.

CARRIER AMPLIFIER SYSTEM 230
Consolidated Electrodynamics Corp. 2-page illustrated bulletin describes the Type 1-127 20kc Carrier Amplifier System. Includes photos, specifications and application data describing the 1-127's use in high-speed transient studies.

AUTOFOCUS ENLARGERS 231
Kindermann Photo Products. Illustrated catalog sheet describes and gives details on the Amatograph-Automat 2¼ x 2¼ and the Amatograph-Automat 2¼ x 3¼ autofocus enlargers. Includes accessories.

GENERAL RADIO EXPERIMENTER 232
General Radio Co. 12-page issue of this company's magazine *The General Radio Experimenter* features an article on the new Strobotac.

WATER TEMPERATURE CONTROL 233
Simix Co., Inc. Illustrated card lists three laboratory and photographic water temperature control units with built-in thermometers. Includes price.

CAMERA & LENS

ULTRA-CLOSE-UPS 209
Karl Heitz, Inc. 4-page illustrated brochure describes the use of the Alpa 35mm single-lens reflex camera for macrophotography.

OSCILLOSCOPE CAMERA 210
Electronic Tube Corp. Illustrated catalog sheet describes the ETC Model SM-200A Oscilloscope camera with Polaroid Land Camera back. Includes full specifications.

TRUE GLASS 211
Servo Corp. of America. 8-page illustrated brochure on Servofrax (R) arsenic trisulfide glass used in the fabrication of infra-red detection and control devices. Detailed drawings and specifications are included on standard cell windows.

3-D MAGNIFIER 212
Edroy Products Co. 6-page illustrated leaflet describes the Magni-Focuser, a 3-D binocular magnifier. Includes prices.

FINGERPRINT CAMERA BOOKLET
Burke & James, Inc. 16-page booklet, *Watson-Holmes Fingerprint Camera,* contains information gathered from authoritative sources edited into a complete treatment of fingerprint and document photography and technique. Request on your letterhead from Burke & James, Dept. L, 321 S. Wabash Ave., Chicago, Ill.

VIEW CAMERA BOOKLET
Burke & James, Inc. 40-page booklet, *Better Pictures,* describes the operation and uses of the Commercial View Camera, both conventional and monorail type. Request on your letterhead from Burke & James, Dept. V, 321 S. Wabash Ave., Chicago, Ill.

ROBOT-STAR II 213
Karl Heitz, Inc. 4-page illustrated brochure describes in detail the Robot-Star II. Lists salient features.

MAGNIFINDER 214
The Ednalite Optical Co., Inc. 4-page illustrated leaflet describes the Ednalite Magnifinder for instantaneous critical focusing of reflex or ground glass images.

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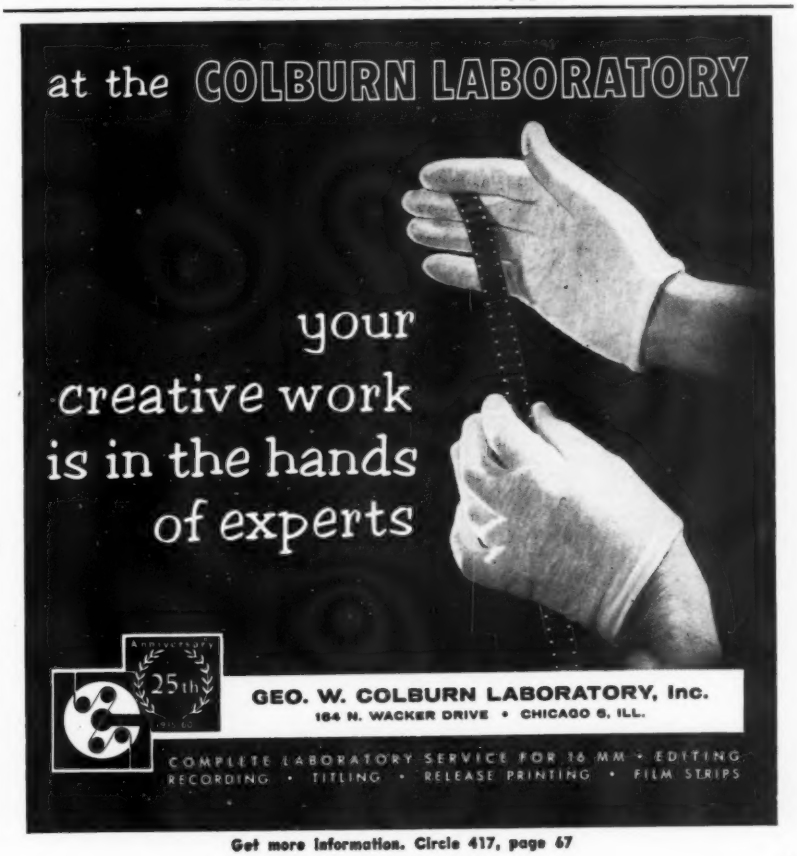
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COLOR FLOWER CLOSE-UPS 215
Eastman Kodak Co. 8-page pamphlet, on color close-ups of flowers has been revised and brought up-to-date in terms of techniques and equipment. Includes data table on close-up lenses for miniature cameras.

OPTICAL SYSTEMS 216
Mast Development Co., Inc. 16-page booklet describes optical systems and film handling devices. Includes a cross-section of 25 solutions to unique photo-optical problems.

ZUNOWMATIC-8 217
Rey Lux Mfg. Corp. Specification sheet describes the Zunowmatic-8 electric eye lens for 8mm movie cameras. Includes price.

MOTION PICTURES

HIGH-SPEED EDITOR 234
Camera Equipment Co., Inc. Illustrated specification sheet gives information and complete specifications on the CECO 35-mm high-speed editor.

16MM CONTINUOUS PROCESSOR 235
Milsco Mfg. Co. 4-page illustrated brochure gives detailed information on the Cramer Continuous 16mm Processor Model 60. Includes complete specifications.

ACCESSORY PRICE LIST 236
Fairchild Camera & Instr. Corp. 4-page illustrated price list gives retail prices for accessories for Cinephonic Eight.

SPRAY PROCESSING 237
Hi-Speed Equipment, Inc. Illustrated specification sheet describes the FA-50 spray developing machine and lists outstanding features.

SERVICES

PRICE LIST 238
Lab-TV. 6-page folder lists prices and services available from this New York laboratory.

RATING LIST 239
Modernage Photographic Services, Inc. Pocket-size list of A.S.A. ratings which are best suited for films when processed in fine grain developer D-23.

SCHEDULE OF RENTAL RATES 240
Florman & Babb, Inc. 18-page price schedule lists rental rates for professional motion picture production equipment including lights, recording and projection equipment and accessories.

PHOTOGRAPHIC SERVICES 241
Meteor Photographic. 10-page catalog of technical information and prices for the black-and-white and color services offered by this Detroit firm.

RENTAL PRICE LIST 242
Behrend Cine Rental Corp. 14-page booklet gives rental prices for professional production equipment including cameras, recorders, microphones, screening room equipment, etc.

VIDEOTAPE RATE CARD 243
Giantview General Television Network. Illustrated rate card gives prices for mobile Video-taping unit with independent power supply for use on location anywhere in North America.

SUPPLIES

DARKROOM PHOTO PRODUCTS 244
Yankee Photo Products. 10-page illustrated folder lists Yankee darkroom photo products including instant film dryer, developing trays and safelights.

PHOTO BOOK CATALOG 245
Amphoto. 26-page catalog of photographic books includes subject and title cross-index.

PHOTOFINISHING CHEMICALS 246
Ansco. 4-page photographic data sheet on Ansco's photofinishing chemicals includes formulas and charts.

DUPLICATING FILM 247
Ansco. Photographic data sheet on Anscochrome Duplicating film Type 544 lists characteristics of the film and equipment and filters used. Also includes general information.

WHITE FLUORESCENT PAPER 248
Hinelight Corp. Sample of special white fluorescent paper for use as background reflector, drawing or display. Includes order blank.

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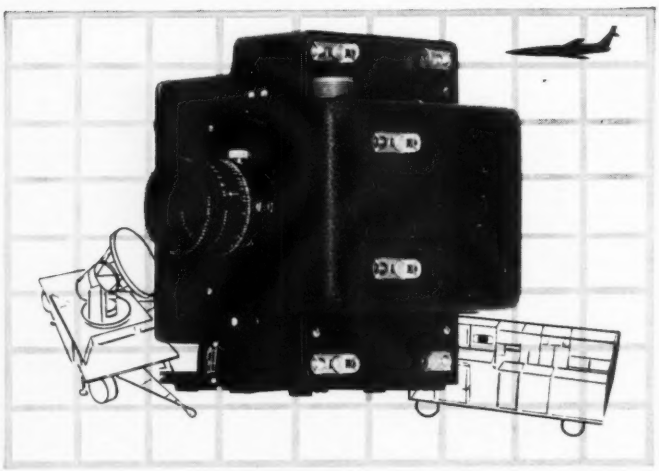

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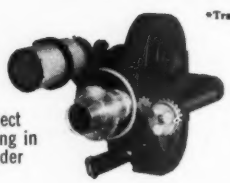

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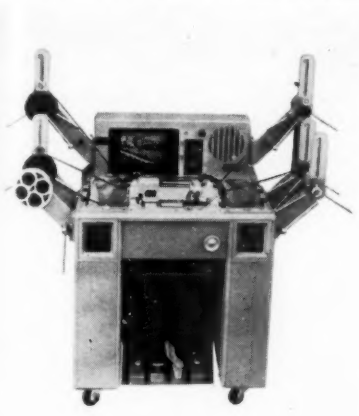
NEW PRODUCTS

For additional information on any new product circle the appropriate number on the readers' service card, page 67.

NEW TRIPOD LEGS 101
The Camera Equipment Co., Inc. announces the use of new, heavy-duty tripod legs on all of its CECO Professional Junior Tripods. According to the manufacturer, these legs assure greater rigidity, no matter how far the legs are extended, because of a groove design that gives almost twice the gripping surface of wood to wood.

EDITING TABLE 102
Intercinema Corp. announces distribution of the English Acmade Mark II editing table, which offers continuous (rather than intermittent) movement as a safety feature for negative or positive color viewing. The table has variable or sync speeds with instant-stop foot or hand controls, and instant clutch action for film or sound



paths. Projected picture size is 8 x 6 in. Price for a complete outfit including 16mm or 35mm picture with composite optical and magnetic sound; separate magnetic sound; footage, frame and time counters; and take-ups and titewinds is $2975.

AUDIO-VISUAL UNIT 103
Synchro-Mat Equipment Corp., which produces a synchronized audio-visual unit consisting of a 35mm slide projector and a tape-recorder, announces production of a new model. It features an all-transistorized amplifier with 7-watt output at 1 percent distortion. The 8-ohm speaker is housed in a fiberglass carrying case. The self-contained unit weighs 34 lbs., is 23 x 13 x 12 in.

OPAQUE PROJECTOR 165
A large size opaque projector, which takes copy up to 6 x 6 in., has been announced by the Edmund Scientific Co. It measures 11½ x 13¾ x 9 in. At a distance of 12 ft. it projects a 7 1/3 sq. ft. image. Lenses are two plano-convex, 3½-in. diameter. Price: $42.

PLASTIC LENSES 104
Low cost, optically ground and polished plastic lenses in a variety of sizes, shapes, and types have been developed by Fostoria Corp. The company claims they are lightweight, have relative lack of distortion, high resistance to chipping and breakage, ease of machining for quick, inexpensive mounting and transmit up to 7 per cent more light than glass lenses of the same thickness. Fresnel, aspheric, and other specialized lenses can be fabricated to customer specification, it was announced.

POCKET MICROSCOPE 105
The 5½-in., 10-oz. Omag Pocket Microscope with built-in illumination and reticule-equipped base plate, calibrated in thousandths of an inch, is being distributed in the U.S. by Karl Heitz, Inc. It may be used with either a plug transformer or two 1.5 volt penlite batteries, and is available in 3 models for different magnification ranges: 10-25X, 18-35X, and 26-50X. Prices: Omag 25—$26.95; Omag 35 and 50—$29.95; base plate with reticule—$19.95; carrying case—$9.90.

SOUND TAPE TABS 106
Highly conductive, pressure-sensitive, aluminum foil tabs, which are applied to magnetic recording tape for automatic stop-start-repeat operations, are new products of W. H Brady Co. Called Brady Quik-Cue Contact Tabs, and costing less than 2¢ each, they can be used on new magnetic tape recorders equipped with an automatic switching feature. When the tab reaches the contact points of a relay on the machine, it actuates the mechanism to stop and shut off the player, or reverse and repeat the program.

ARRI 16 HI-HAT 107
The Arri 16 Hi-Hat, ball-socket, quick leveling hi-hat for 16mm equipment, was announced by Birns & Sawyer Cine Equipment Co. The adjustable hemispherical collar is designed to accept Arriflex pan heads as well as other types of ball adapters. Price: $34.

OPTIMA IIs 108
Agfa has announced the 35mm Optima IIs which features the Prontormator "electric eye" system that sets both lens opening and shutter speed. It has a coupled rangefinder and a 45mm Apotar f/2.8 lens. Price: less than $100.

FERROTYPE PLATES 111
A new line of stainless steel ferrotype plates, usable on both sides, has been announced by Photo Materials Co. Prices are from $2.95 for the 10 x 14-in. size to $7.95 for the 18 x 24-in. plate.

A new screen for viewing pictures in undarkened rooms

It is true that you can project better pictures in darkened rooms—but there are many times when room darkening is inconvenient, difficult and costly. Now, with the new Radiant exclusive "truly lenticular" screen, which controls **both** horizontal and vertical light reflection, you can project slides and movies effectively in normally or partially lighted rooms where no unusual lighting conditions prevail. For industry and business—this permits projection in shows, conventions and offices where room darkening is not practical.

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which gives the complete explanation of this new truly lenticular screen, also catalog giving specifications and prices of Radiant's complete line of lenticular and glass-beaded screens of every type for every purpose.

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PROJECTION ZOOM LENS 109
An f/3.5 projection zoom lens has been developed for Kodak Cavalcade Projectors, Models 510 and 520, and is available either on these models or as a separate item. Acording to the manufacturer, this lens permits the operator to adjust the picture to the screen from any convenient distance. The lens adjusts in focal length from 3¾ to 6¼ in. Separately, the lens costs less than $40.

RETINA AUTOMATIC III
The new Kodak Retina Automatic III Camera, introduced by Eastman Kodak Co., features a fully-automatic exposure control and rangefinder focusing. A photoelectric exposure meter determines correct lens opening for any one of five shutter speeds from 1/30 to 1/500. Manual exposure control is also provided. Price: $129.50.

ASCORLIGHT ASSEMBLIES 115
American Speedlight Corp. has added two new assemblies for color portrait work to its Series 400 line. The A425 4-Light Assembly is a fast recharge version of the widely-used A424. Two 10-in. main lights, which use low cost, clear Mazda bulbs, give the "direction" of the lights. The hairlight and backlight are identical, except for the use of a snoot with the hairlight.

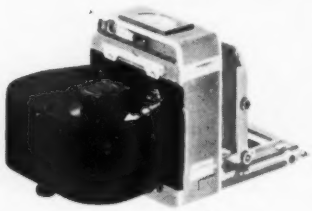
Ascorlight A426 is a deluxe version, incorporating light output stabilization plus the capability of switching from left-hand to right-hand lighting.

REAR-PROJECTION SCREEN 113
Polacoat, Inc., has introduced a new portable, daylight, rear-projection screen called the "Red-I-Frame Lenscreen," which it says provides rich images even when faced into full room illumination.

The rear-screen membrane is made of durable vinyl-latex plastic permeated with special lens cells. The screen frame is assembled from sections of tubular parts to which the elastic screen panel is hooked. All parts fit into a compact box for shipping or storage.

The Red-I-Frame Lenscreen is available in 17 sizes from 4 x 5 ft. to 9 x 12 ft. and is priced from $80 to $334.

ROLL FILM MAGAZINE 116
Keith Camera Co. has announced a three-way roll film magazine for all cameras using 4 x 5 Graflok backs. It is available for 35mm, 70mm and 90mm films. An exposure counter is optional. Price: $119.50.



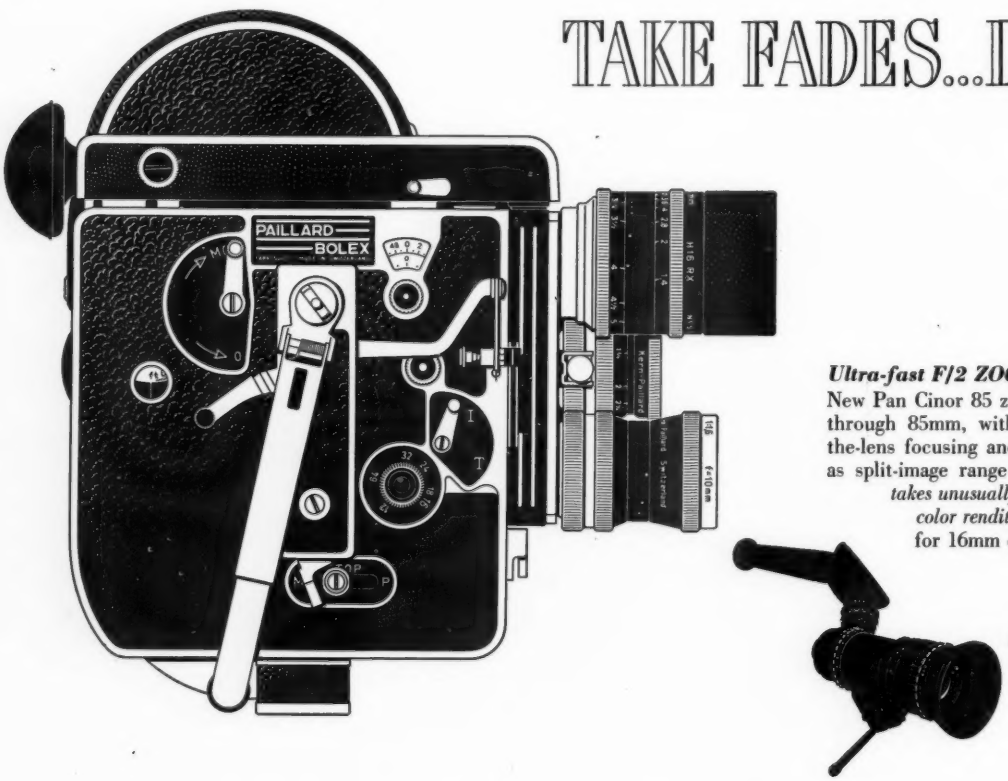
MOBILE-LITE REEL 110
Cordomatic has announced its new Model 505 Mobile-Lite Reel with an extendable and automatically retractable 20-ft. electric cord. A light, attached to the reel on a universe swivel, can accommodate a 150-watt flood, spotlight, or incandescent bulb. The pistol-grip light handle contains a built-in electric outlet for appliances.

REPLENISHMENT SYSTEM 112
A pushbutton-controlled chemical replenishment system, accurate to within 1 per cent, has been introduced by Bernalen, Inc. Operated on a principle of pump equalization pressure, it automatically compensates for different chemical rates; and has low-level sensing and safety controls.

ELECTRIC FILM TIMER 117
A new electric film timer with two synchronous timing motors and two precision footage counters to measure total footage and its equivalent time in minutes and tenths has been announced by Camera Mart. Prices: 16mm or 35mm footage counter with timer; $85, combination 16/35mm footage counter, no timer; $85, single 16mm or 35mm, no timer; $45.

STEREO TAPE RECORDER 121
Roberts Electronics, Inc., has released its Roberts "990" portable stereo tape recorder with a 4-track stereo record play, 2-track stereo playback, 4-track monaural record/play, dual head outputs, dual preamp outputs, dual power amplifier outputs, and dual monitor speakers. $399.50.

TAKE FADES...LAPS...



Ultra-fast F/2 ZOOM LENS
New Pan Cinor 85 zooms from 17mm through 85mm, with reflex through-the-lens focusing and viewing as well as split-image range finder. *This lens takes unusually sharp detail and color rendition.* Has C-mount for 16mm cameras. $420.00.

All prices include Federal Excise Tax where applicable.

Get more information. Circle 461, page 67

BARNDOOR 158
A 4½ oz. flexible aluminum barndoor that folds flat for portability has been introduced by Lowel-Light Photo Engineering. It has removable 5 x 10-in. door flaps that swing back 270° to allow wider angle shots with low ceilings. The barndoor, which can be used with all portable clamp-on lights using R 40-type reflector bulbs 150 to 500 watts, fits on to the front of the bulb. Price: $5.75.

COLOR ENLARGER 159
The Chromega B-10, manual focus enlarger with built-in color filtration and timer for 2¼ x 2¼ and smaller negatives, has been announced by Simmons Bros., Inc. It accepts lenses from 2 to 3½ in., permitting magnification from 1½ to 7X with a 3½-in. lens and 4 to 14X with a 2-in. lens. The new lamphousing, which is available separately to owners of B-7 and B-8 enlargers, aims light through the filter system into the integrating sphere. The filtered light is then mixed and directed down towards the negative for light distribution without condensers, according to the company.

8MM ZOOM PROJECTOR 160
A 9-lb., 7½ x 11-in., 8mm zoom projector has been introduced by Sekonic, Inc. It features the Resonar f/1.6 projection lens, a 50-watt low voltage lamp, and provisions for attaching splicer, editor and anamorphic lens. It has a 400-ft. reel capacity and can operate on any voltages ranging from 110 to 220. Price: $109.95.

PROJECT-O-STANDS 114
Safe-Lock, Inc., announces the addition of new models to its line of Project-O-Stands, which feature an all-aluminum frame of 1-in. diameter heavy wall tube with a tensile strength of 30,000 psi. A 24 x 20-in. top section is directly supported by the frame and has a durable skid-proof surface. These new stands will safely support the heaviest projectors, amplifiers, tape recorders, record players, or TV sets, the company said.

MOTOR-DRIVEN ZOOM 162
A new motor drive for the zoom movement of the 17-70 Angenieux varifocal lens has been announced by the Arriflex Corp. of America. The unit consists of a miniature motor and gear mechanism, which is mounted directly on the lens barrel by means of a special split-ring clamp. The control unit is designed to mount on the panhead handle. The miniature motor operates from the same 8-volt DC battery pack as the camera. Model 70 varifocal lenses already in the field, as well as new lenses, may be equipped with the motor drive. Price for motor drive alone: $249.50.

INSPECTION MAGNIFIER 164
A C Clamp Inspection Magnifier with a 24-in. chrome-plated flexible arm has been produced by the Testrite Instrument Co., Inc. It features a ball swivel, which permits the magnifying glass to be tilted to any angle. Prices: with 3-in. lens, $8; with 3½-in. lens, $8.50; with 4-in. lens, $9.

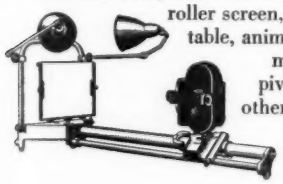
AG ADAPTER-REFLECTOR 163
An AG flashbulb adapter, called the Accura, which fits standard flashgun sockets, has been introduced by Photographic Importing & Distributing Corp. It is equipped with an ejector and a 2-in. reflector. Price: 98¢.

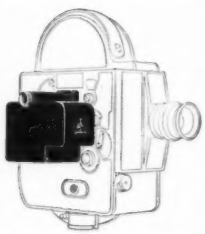
GENERAL RADIO STROBOTAC 119
A new design for the stroboscopic tachometer, widely used for the measurement of rotating machine-part speeds and observation of their operation in slow-motion, has been announced by the General Radio Co. It features a fundamental speed range of 110 to 25,000 rpm.

ALL EFFECTS WITH NEW BOLEX REFLEX

New variable shutter on Bolex 16mm Reflex puts fades at your fingertips. Hand backwinding for dissolves. Parallax-free through-the-lens viewing and focusing while shooting. Footage and frame counters . . . speeds 12 to 64 fps . . . settings for time exposure, single frame and continuous run . . . many other extras. (*Automatic* REXOFADER *shown on camera is a new push-button control that times fades*, optional at only $37.50.) With Lytar 25mm f/1.8 lens, the Bolex H-16 REX® is only $400. (Lenses shown optional at extra cost.) Write Department RPM11 for literature and name of nearest dealer. PAILLARD Incorporated, 100 Sixth Avenue, New York 13, N. Y.

Bolex 16mm Titler: Optical bench, main frame, two reflectors, title frame, sliding cradle and rackover, $169.50. Accessory kit: roller screen, drum, turntable, animation frame, mirror frame, pivoting plates, others for special effects, $141.00.





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Drives a full roll of film through camera with absolutely constant speed. No lost shots while rewinding! Easy to attach (no special tools necessary). Speeds from 12 to 32 fps. Complete with battery case, $89.50.

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Get more information. Circle 461, page 67

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SLIDE COPYING

(*continued from page* 34)

cuts contrast and which he feels results in a sharper image too.

He uses long Nikor tanks that accept 14 35mm Nikor reels for color processing. He elaborates the procedure with two time-and-trouble-saving tricks. One is to cover the Nikor tank with a square of Saran before capping it with the stainless cover. This, he says, permits him to invert the tank for agitation without dripping chemicals. The other innovation consists of a light-box drawer containing fluorescent tubes which is fitted under the processing sink to facilitate re-exposure.

Ward prefers the long Nikor cannisters to a rack for 3½ gal. hard rubber tanks because the Nikor unit requires only 1 gal. of solution. This is important to Ward because he discards the batch of chemicals after each use (although he may run more than 14 rolls during one session).

Broken bottleneck

The bottleneck in an operation of this sort is apt to be cutting and mounting the film. Ward made his heaviest investment in his mounting equipment in an attempt to speed this part of the operation. He uses a cutter and a mounting press purchased from Byers Photo Equipment Co., 4033 S.E. Milwaukie Ave., Portland 2, Ore. Together they cost about $625. There are more sufficient units, but they are more costly and Ward finds that these units closely match the remainder of the production. His operator is able to cut and mount about 700 slides per hour. Another feature he likes about the Byers unit is that it operates with compressed air which he feels will reduce the chance of failure.

When Ward began his business, he found a ready market and little competition for 35mm black-and-white slides that are released to television stations. Most stations find this format well adapted to their use and publicists like it because the cost is low.

In most cases, he is supplied artwork or black-and-white prints for the slides. He copies them using the conventional 45° copying illumination and the Reprovit focusing stage described earlier.

One further addition is required for copying opaque originals in Ward's system. He uses a Projection head for the focusing stage ($27), and places a television format grid above the focusing glass of the stage. Thus he is able to project the format onto the copy. It makes framing a

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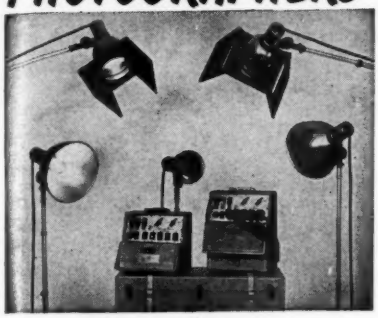

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Get more information. Circle 423, page 67

good deal easier and it also enables him to focus on the copyboard. (There is a focusing target in the ground glass of the focusing stage.) In other words he does his copying as if he were enlarging instead of reducing.

The television slides require a special kind of tone quality. Like a white shirt on an actor, a clear area on a slide is just too hot for the television system. The thing is to have tone throughout, yet have enough contrast so that the final image does not look too grey. Rather than try to explain what the picture should look like, Ward thinks that the idea can be communicated by describing the process.

He photographs all copy, line or continuous tone, with Panatomic-X. He assigns this an exposure index of 160. He develops his film in D-11 diluted 1:1 to the point where he gets normal highlight density. He then contact prints this negative on Gevaert Fine Grain Positive and develops it normally.

Ward uses different sets of techniques for A-V slides. Line copy is photographed on Kodak High Contrast film, developed according to instructions: Ethol LPD 1:1 for 6 min. at 68°F. Continuous tone copy is exposed normally with Panatomic-X developed for three minutes in UFG. All the final transparencies are made by contact on Gevaert Fine Grain Positive, which Ward finds convenient to buy in 1000-ft. spools.

Ward is most pleased with his discovery of a medium-priced semi-automatic 35mm contact printer which fits his needs to a T: a Karl Heitz-imported Color Contact printer for about $110. He has refined it slightly with an exposure timer and a Productometer, which he picked up at an electronics supply store. The Productometer chalks up a number as each exposure is made.

The light-tight magazine of the contact printer holds 50 ft. of film. Although print film and negative are advanced by hand, the operation is very quick according to Ward.

Ward develops his fine grade positive film in Ethol LPD diluted 1:2. He uses 50-ft. Nikor reels for this processing, but only the reels.

The tanks are Rubbermaid plastic kitchen basins picked up at a housewares store.

Ward has purchased two additional pieces of equipment which he feels are desirable but not absolutely necessary to an operation of this sort; a $79 Kodak Static Control Kit and a complete air-conditioning system—THE END.

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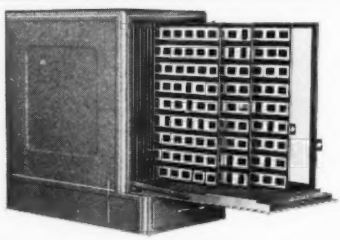

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FYI

(*continued from page* 8)

System Design, a definitive work, was published by D. Van Nostrand Co., New York. A graduate of Purdue, Even received his BSME in 1933 and an MS in Industrial Engineering from Wayne in 1955. One of the country's leading authorities on the use of microfilm in high-volume engineering systems, he won an Army Commendation for Meritorious Civilian Service for designing an integrated engineering data processing system for Army Ordnance. He is a member of Society of Reproduction Engineers, National Microfilm Association, American Institute of Industrial Engineers and Society for the Advancement of Management.

Also among the new faces at the tops of columns are Jim Cooper and Robert Goode who will present the *Manager's Viewpoint*, a column dealing with problems faced by managers of reproduction sections.

Jim Cooper is manager of the Photo and Reproduction Department at University of Michigan's Willow Run Laboratory. He has been in the field since 1948 and is a member of SMPTE, SPSE, PPofA and was a founding officer of the Industrial Photographers' Association of Michigan.

Robert E. Goode has had a varied career in photography, his interest beginning as a student of Neblette at Texas A & M. This was followed by 17 years in Navy photography including duty in still, movie, reproduction and photogrammetry units. He was photo officer on the USS Saratoga. In 1951, he became Supervisor of Photography and Reproduction Services at Hughes Aircraft Co., Tucson, his present job. Part of his duties include operation of a job printing plant and blueprint department. He is a member of SPSE and the Industrial Division of PPofA. He is also active in the Arizona Professional Photographers Association.

We don't know about you but one of the most informative newsletters we receive is that written by Don Mohler for General Electric's Photo Lamp Department. Don is an old pro in both writing and photography and it shows in his letters. While they deal mostly with flashbulbs in general and a certain company in particular, they do contain much useful information. The current issue, No. 15 dated August 1960, has a useful table of listing the reflectivity of various objects to help get better bounce exposures.

Did you know, for example, that a white dog has twice as much reflectivity as pale skin (70 per cent to 35 per cent) while tan skin (for the benefit of you photographers in Florida and California) has only 20 per cent reflectivity. There is more too, all good and to the point.

Travel notes and all that

While on things British in our hands-across-the-sea mood, we find that there is now, at Central Hall, Westminster, London, an exhibit of 35 award-winning pictures submitted by PP of A's Industrial Division. The invitation was issued by the Institute of British Photographers. There is also a symposium on "Industrial Photography in the United States", with Morris Gordon, who needs no introduction, as moderator, with Ralph Baum of Modernage Photo Service (customer finishers), Bill Summits of Life's photo lab and the peripatetic man from Leitz, Milt Freier, making a detour from the Photokina-New York route. Ed Purrington, formerly with Ford, will present "Photographic Applications within the Ford Motor Company."

The exhibitors include: J. F. Knox, Birmingham, Ala.; Robert E. Goode, Hughes Aircraft Co., Tucson, Ariz.; K. Gordon Maughan, Jet Propulsion Laboratory, California Institute of Technology; Keith V. Adams and Jack Stevens, both of Convair Astronautics, San Diego, Calif.; Gervase A. Arndt, Markham, Ill.; David C. Englund, 328 Albert Ave., Frank Monarchy, Rockford Memorial Hospital, Rockford, Ill.; Charles Lee Norton, Avco Research & Advance Div., Wilmington, Mass.; Oscar F. Goodwin, Richard E. Hodges, Sandia Corp., Bill K. Laskar, Albuquerque, New Mexico; Duane G. Banks, U. S. Bureau of Mines, Monroeville, Pa.; Jack Engel, United Engineering & Foundry Co., Henry O. Navratil, Allis-Chalmers Mfg. Co.; and Martin C. Wagner, Town & Country Studio, Jackson, Tenn.

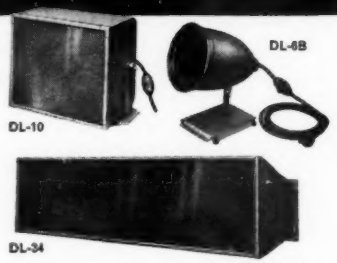
Bob Saitta is now representing Gevaert in the Southwest. Working out of Dallas, Texas, he will sell and service photographic, microfilm and movie products.

Reuben Siegel is now Senior Project Engineer in the photo development section of Mergenthaler Linotype Co., Brooklyn, N. Y.

In memorium

We join with the rest of the photographic industry in offering our deepest sympathies to Frank Zucker of Camera Equipment Co. on the sudden loss of his son, Bert. The tragedy has shocked all who knew and worked with the firm.

DARKROOM SAFELIGHTS



For perfect darkroom illumination, select one of nuArc's dependable safelights. These sturdily constructed safelights have silver hammerloid finishes, and you will be able to find one to fit your particular need, whether it be for wall mounting, for ceiling suspension or the DL-6B which has an adjustable bracket for use on wall or table. See your dealer or write for Bulletin No.

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Get more information. Circle 458, page 67

Get more information. Circle 418, page 67

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24 EYES ON THE BALL

(*continued from page* 59)

construction of a special device was necessary.

Final design for the equipment consists of what is actually three complete and identical 35mm camera assemblies, each of which has eight separate lenses and shutters, a supply magazine, a film holder, and a take-up magazine. One man can operate the three assemblies as one camera. Each supply magazine will hold from 100 to 400 feet of film; one test uses four feet of film per assembly. It is therefore possible to take records of from 25 to 100 missile model tests with one loading of film.

The filmstrip is fed from the supply magazine through the camera assembly and into the take-up magazine. The entire 8-unit assembly is then swung into position over its row of oscilloscopes, and each lens-and-shutter unit fits into place snugly, light-tight, between the scope face and the film holder. To provide a comparison in studying the oscillographic record of each probe, a calibration picture, using a known voltage, is made before the missile model is subjected to the high-velocity air stream in the tunnel. This calibration picture is taken on the first half of each frame on the strip of film; the strip is then moved along to present the second half of the frame for exposure during the missile test. The only light necessary to expose the film is that generated by the oscilloscope tube.—THE END

HIGH SPEED AT WISCONSIN U

(*continued from page* 63)

make a picture of a .22 slug (slicing a calling card in two, for example) or hitting a wire. The new Polaroid 4 x 5 film holder and the new 4 x 5 film enabled them to take their result home with them. It was a fast operation in all respects and Gershon has the unique honor of leaving a .22 slug in the wall of a University of Wisconsin conference room.

Don Parsons of the Sandia Corporation provided some spectacular movies made by high-speed photography in the field of nuclear weapons research and rocketry. He pointed out what is probably the most serious obstacle to further progress in the photo instrumentation field—most engineers just do not know what they can do, learn, and measure with the photographic method. This he felt was the real challenge of photographic instrumentation.—THE END

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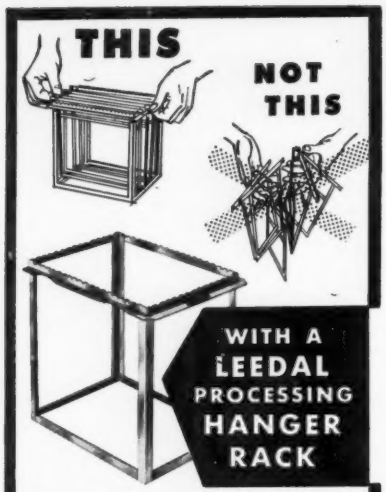

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RESEARCHER'S REPORT
(*continued from page* 43)

effect on the developer if the suspension is filtered out after mixing.

Other types of fungus and microorganisms thrive in a developer and react with the sulphite changing it to sulphide which fogs photographic materials. Certain types of fungus, in contact with the material, can ruin the film by reacting with the gelatin in the emulsion. This is partially offset in color processing by the use of a stabilizing bath which destroys potential mold formation as well as permatizing the dye image.

There are other photographically active materials which can escape ordinary filtration such as copper sulphate or excessive sulphites but the occurrence of these in dangerous concentrations is rare. One last common problem in filtered water, however, could be the pH. Most water supplies are between a pH of 6.0 to 8.0, but there are supplies ranging from a pH of 4.5 to 10.0. It may be necessary to adjust the pH of working solutions to prevent abnormal stresses on the gelatin layer and to give the operating solutions their correct activity. The pH of your water supply, as well as the hardness and analysis of foreign matter, may vary from day to day, and from season to season depending on treatment, storage conditions, usage, and source of supply.

Filtering does remove particles. Dirt particles can cause spots and physical damage areas on the emulsion while other particles, such as finely divided sulfur from sulfur laden waters can cause fogging or stains. The presence of iron or rust can be extremely troublesome and suspended organic or mineral matter can leave a scum on dried film. The filtering of the public water supply does not guarantee the removal of all particles. They may enter the water from the pipes or during cleaning and transfer operations made on the supply lines or filtering beds. To eliminate all possible chance of contamination, an auxiliary filter should be incorporated into the supply line just before the water is used to wash materials or mix chemicals.

The water we usually take for granted can contain many sources of possible contamination. With proper filtration, the public water supply serving most of our large populated areas can be used for photographic processing with complete confidence. For other areas, and for private supplies, additional treatment may be necessary to eliminate the possibility of permanently damaging photographic materials. In all areas some pH or hardness adjustment may be necessary as a permanent installation or during certain seasons.

Once a photographically pure supply of water is obtained it is still necessary to obtain a sufficient supply with adequate drainage and to maintain it at the correct temperature. A poor flow of water can give inadequate wash to all materials. In black-and-white processing this can lead to the retention of thiosulfate salts which cause the eventual fading or staining of the image. In color processing, the proper flow is even more necessary as fog level, color balance, stain and dye stability are all affected by the washing rate. Estimates of mixing supplies, personnel consumption, possible expansion, varying supply pressure and a secure safety factor should all be considered when anticipating water needs.

The drain system should be capable of handling your maximum water flow. Some municipalities have regulations regarding drainage and the water service engineer should be consulted before designing a drainage system.

Water temperature is a continuing variable. Along with the pH tolerance and hardness range, the temperature variation constitutes the three most useful items which can and should be found from the local Department of Public Works. The tempering of the water supply to the correct temperature for washing and solution tempering system can be a costly installation. In some areas the water supply will always be colder or warmer than the required temperature. A single installation to cool or heat is necessary. In most areas, however, the public water supply will be too warm in summer and too cold in winter requiring equipment which will cool the supply in summer and heat it during the winter months.—THE END

Howard Hall, who wrote the above for the Ansco Finisher News, *while the Ansco Color Finisher Technician for the Boston and Binghamton Districts, is Branch Technician for Ansco's New York District. Mr Hall is a graduate of Rochester Institute of Technology, and is currently pursuing a Master's degree at New York University. This is the second in a series of reports solicited from technical personnel in the photographic industry.*

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Donald Wong, Medical Photographer at Manhattan Eye and Ear Hospital, reports: The Sylvania Sun-Gun, although advertised for amateur movie use, looked as if it had possibilities for situations where a small, fairly powerful light source is needed. Comparing the Sun-Light with a photoflood, it offers more even lighting, easier handling, ability to "bounce" light easily and longer bulb life.

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In short, this is an amateur product which is an extremely useful piece of equipment for any professional who uses photofloods.—THE END

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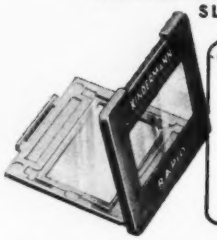

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METHODS FOR TOMORROW

(*continued from page* 14)

8. A New Dry Photographic Process, R.H. Sprague, E. Wainer and H. Fichter (Horizons).

This is an entirely new photo system, according to the authors, that is twenty times faster tha diazo materials. Indications are that much greater speeds are possible. It utilizes "free radicals" generated from polyhalogen compounds by near ultraviolet radiation and their subsequent reaction with arylamine compounds to form a direct print-out dye image.

9. New Photographic Process, J. Robillard (General Transistor).

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IND MOTION PICTURES

(*continued from page* 25)

This style of technique is tiring visually unless the subject is very unusual and exciting. However, I must emphasize the fact that any newsreel style film would be improved in effectiveness, emotional appeal and attention holding if it had smooth visual continuity and more sophisticated cinematic technique. The only exception may be the on-the-spot documentary account film that may lose its immediacy or credibility if it is shot and put together too carefully. But even this type of film can be improved if it is put together with montage-type editing.

Newsreel technique is not a cinematic technique because it does not take advantage of the unique and inherent qualities of the motion picture medium. It is like hooking up a well-running Cadillac to operate a circular saw. It can do it but it seems like a waste, as it can do other things much better. The most important value of the motion picture is the fact that it is essentially a *visual* medium with unique qualities.

In my next column I will go into greater detail about what we mean by cinematic technique. I will discuss match cut visual continuity type films and the concept of different film montage techniques.—THE END

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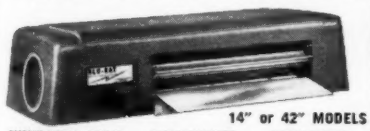

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